CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL

A THESIS SUBMITTED TO BABA FARID UNIVERSITY OF

HEALTH SCIENCES, FARIDKOT (PUNJAB)

IN THE PARTIAL FULFILLMENT

FOR THE AWARD OF DEGREE OF

DOCTOR OF MEDICINE

IN

PAEDIATRICS

2024

Submitted By

DR. LOVEPREET SINGH

DEPARTMENT OF PAEDIATRICS
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA, PUNJAB

DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled **"CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL"** submitted towards partial fulfillment of the requirements for the award of **MD IN PAEDIATRICS** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Deepak Bhat** Professor& Unit Head, Department of Paediatrics & **Dr. Gurdeep Singh Dhooria,** Professor, Department of Paediatrics. No part of this thesis has formed the basis for the award of any degree previously.

_____

DR. LOVEPREET SINGH
Department of Paediatrics
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

Place:

CERTIFICATE OF SUPERVISORS

This is to certify that the work incorporated in this thesis entitled **"CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL"** has been carried out by **Dr. Lovepreet Singh** under our direct supervision. The data incorporated in this thesis is original and genuine and has been carried out by the candidate himself.

Signature of Supervisor

Dr. Deepak Bhat
Professor& Unit Head
Department of Paediatrics
DMCH, Ludhiana

Signature of Co-Supervisor

Dr. Gurdeep Singh Dhooria
Professor
Department of Paediatrics
DMCH, Ludhiana

Date:

ENDORSEMENT BY THE HEAD OF THE INSTITUTE

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DMC&H, Ludhiana

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Dr. Lovepreet Singh
Department of Paediatrics
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

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Dedicated
to
My Grandmother
Late Mata Amar Kaur

ACKNOWLEDGEMENT

I am highly grateful to the Almighty, without whose blessings no work can be completed. He is the one who holds our hand and guide us through every step.
I take this opportunity to thank all those who have been helping me in successful completion of this work.

With a deep sense of gratitude, I wish to convey my thanks to my esteemed teacher Dr Deepak Bhat, Professor and Unit Head, Department of Pediatrics, DMCH, Ludhiana for being so supportive throughout, His able and mature guidance made the assigned task easier to accomplish. His indelible help at all stages helped me a long way in compilation of this project.

It is with great reverence and profound pleasure that I acknowledge the valuable suggestions by my co-supervisor Dr Gurdeep Singh Dhooria, Professor, Department of Pediatrics, DMCH Ludhiana. His constant encouragement during whole time helped me in completing this project.

I also wish to thank all my teachers Dr Puneet A Pooni, Dr Jatinder Singh Goraya, Dr Siddharth Bhargava, Dr Kamal Arora, Dr Shruti Kakkar and Dr Karambir Singh Gill.

I am indebted to my seniors cum teachers Dr Mehak, Dr Anupreet, Dr Himanshu, Dr Bhavna, Dr Vishal and Dr Akshay for their encouraging words, support and guidance throughout the duration of thesis.

I also want to thank my seniors Dr Amneet, Dr Mitali, Dr Navneet and Dr Harpreet who thought me every intricacy of being a good pediatrician despite all odds.

My Thanks to my colleagues Dr Savi, Dr Kirti, Dr Veronica, Dr Mayank, Dr Amandeep, Dr Asmita for their brilliant company in this journey. They have been invaluable support day in, day out for the entire work.

I would also like to thank all my juniors with Special Thanks to Dr Deeshu and Dr Mridul who have helped me to complete my project.

I am really grateful to my friends- Sanjam, Robin, Ankit, Pavel, Prashant, Janvi, Romi, Baljinder with special Thanks to Dr Navneet Mehmi and Dr Rahul Mehmi for standing by me through thick and thin. They have been greatest mental support throughout these years.

My Special thanks to Pushpa ji for being a stress buffer for all residents.
Words are inadequate to express my sense of gratitude to my father Mr. Amrik Singh and my mother Mrs. Jasbir Kaur for their unconditional love and support that helped me sail through all hard times. I feel blessed to have my elder sister Vandana and Brother-in-law Sunil Kumar Sidhu, Elder brother Dr Sukhraj pal singh and Sister-in-law Dr Amninder Kaur for continuous support, help and encouragement in all walks of life.

I would also like to thank my Neice Bableen Kaur, she brings immense joy and inspiration into my life. Her laughter, curiosity and boundless energy reminds me of the importance of perseverance and beauty of discovery.
I would like to extend my heartfelt gratitude to all my relatives. Their collective support, encouragement and love have been invaluable to me throughout this journey.

Thanks to all patient who have been a part of this study.

Dr. Lovepreet Singh

LIST OF ABBREVIATIONS

DMCH	Dayanand Medical College and Hospital
TB	Tuberculosis
WHO	World Health Organization
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency syndrome
NTEP	National TB Elimination Program
EPTB	Extrapulmonary Tuberculosis
M.TB	Mycobacterium Tuberculosis
BCG	Bacille- Calmette-Guerin
RNTCP	Revised National Tuberculosis Program
DOTS	Directly Observed Treatment Short Course
CMI	Cell Mediate Immunity
TBM	Tubercular Meningitis
AFB	Acid- Fast Bacilli
TST	Tuberculin Skin Test
PPD	Purified Protein Derivatives
CBNAAT	Cartridge Based Nucleic Amplification Test
IS	Induced Sputum
GA	Gastric Aspirate
LPA	Line Probe Assay
PCR	Polymerase Chain Reaction
ESR	Erythrocyte Sedimentation Rate
FNAC	Fine Needle Aspiration Cytology
ATT	Anti Tubercular Therapy
CSF	Cerebrospinal fluid
CT	Computed Tomography
MRI	Magnetic Resonance Imaging
NTCP	National Tuberculosis Control Program
CNS	Central Nervous System

ABSTRACT

Introduction: Childhood tuberculosis (TB) is a good indicator of recent transmission of TB in the community. The global burden of TB cases shows that 44 % of the total cases were from Southeast Asia, and India alone accounts for 27 % of total burden. The main risk factors of childhood TB are co infection with HIV, overcrowding and immigration. Diagnosing TB in children can be challenging as many childhood diseases mimic TB. So only a high index of suspicion is required for an early diagnosis childhood TB to prevent a possible poor outcome. We thus plan to undertake this study with an objective to evaluate the profile of children with tuberculosis and to determine the risk factors.

Aim of the Study: To study the clinical profile of children with Tuberculosis.

Materials & methods: This was a prospective observational study which was conducted in the department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana. All the diagnosed children with Tuberculosis coming to OPD/IPD was taken in the study after taking due consent

Results: The study revealed that tuberculosis (TB) was most prevalent among older children aged 11-15 years, with a nearly balanced gender distribution (52% males, 48% females). The most common clinical symptoms were fever (92%), loss of appetite (73.3%), and weight loss (65.3%). Pulmonary TB was the most frequent type (32%), followed by abdominal (30.7%) and CNS TB (29.3%). A significant portion of patients (48%) were malnourished, highlighting the intersection between TB and malnutrition. Various diagnostic methods, including Mantoux test, IGRA, and CBNAAT, were used, with IGRA showing a high positivity rate (69.3%). Despite most cases showing no abnormalities on chest X-ray (68%), treatment outcomes were positive, with significant weight gain observed during follow-up.

Conclusion: The study provides valuable insights into the epidemiology, clinical manifestations, and diagnostic challenges of pediatric TB in Ludhiana, India. It underscores the need for early diagnosis, comprehensive treatment strategies, and nutritional support to improve outcomes in this vulnerable population.

Keywords: Tuberculosis, CBNAAT, Pulmonary TB, Extrapulmonary, Tuberculin skin test (TST)

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BABA FARID UNIVERSITY OF HEALTH SCIENCES
Sadiq Road, Faridkot-151203 (Pb.) INDIA
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INTRODUCTION

Over 4,000 years have passed since tuberculosis first infected humans, making it one of the most significant infectious illnesses in the world. The Mycobacterium tuberculosis complex comprises five closely related species: M. tuberculosis, M. bovis, M. africanum, M. microti, and M. canetti. In India and around the world, Mycobacterium tuberculosis is the most frequent cause of tuberculosis.[1]

According to the World Health Organization, tuberculosis has surpassed HIV/AIDS as the primary cause of death from an infectious disease on a global scale since 2015. [2] Furthermore, mycobacterium tuberculosis infected nearly one-third of the world's population. In developing nations, approximately 95% of tuberculosis instances occur. Asian nations reported the greatest number of instances. [2] According to WHO data from 2020, an estimated 10 million persons worldwide contracted tuberculosis, of which 5.6 million were men, 3.3 million were women, and 1.1 million were children under the age of fifteen.

Typically, the focus has primarily been on diseases that affect adults. In comparison, the attention given to paediatric TB has been very limited, mostly because of the more difficult nature of diagnosis and the traditionally lower importance placed on children by TB control programs. Consequently, both the available research and surveillance data on childhood tuberculosis have been significantly restricted. However, despite the global estimation of over one million cases per year, with a significantly higher likelihood of severe illness and mortality among young children compared to adults, pediatric tuberculosis continues to be a critical public health crisis. This is especially apparent in underdeveloped nations characterized by inadequate public health infrastructure. [3-6]

Tuberculosis is presently one of the ten leading causes of mortality among children.[7] Children infected with tuberculosis today will serve as the reservoir for the disease tomorrow. Historically, the global tuberculosis and health communities have ignored childhood tuberculosis and have never considered it a significant public health concern. Considering that minors with tuberculosis are typically less contagious than adults, national TB control programs have accorded them little attention. Despite being diagnosed and treated for tuberculosis, a significant number of minors do not register with or are not reported to the national TB programme. [8]

Annually, an estimated one million cases of pediatric tuberculosis occur worldwide, representing ten to fifteen percent of all TB cases; more than one hundred thousand fatalities are attributed to this disease. [9]

In India, around 3.42 lakh children (aged 0-14 years) are estimated to contract tuberculosis (TB) annually, constituting approximately 6% of the total TB cases reported to the National Tuberculosis Elimination Program (NTEP) in 2020. Specifically, in 2020, about one lakh children with TB (0-14 years) were reported to the NTEP, with an additional 1.4 lakh children in the age group of 15-18 years. Children consistently make up 6-7% of all patients treated under NTEP each year. However, there are variations in case reporting among states due to differences in disease burden, health-seeking behavior, and service availability. Despite an estimated detection gap of about 56%, nearly a third of global pediatric TB cases are from India. Children up to 14 years old comprise 35% of the country's population and are estimated to contribute around 10% of the TB caseload. Nevertheless, reported numbers may underestimate the true burden as many children receive treatment outside the National TB program. [10]

Pulmonary TB is prevalent among children, yet extra-pulmonary TB (EPTB) constitutes a significant portion of cases compared to adults. This is due to the longer adulthood span, leading to adults forming the largest proportion of TB cases. TB control is not a primary focus in child survival strategies, which primarily target diseases with high mortality rates among children under five, such as premature birth, perinatal asphyxia, pneumonia, and diarrhea. While TB contributes to childhood mortality, its exact impact on "Under-5 Mortality" remains unclear. Despite being an important cause of childhood mortality, TB often goes unrecognized in this context.[10]

Many TB-related deaths may be misreported as pneumonia due to similar respiratory symptoms, as supported by autopsy studies from several African nations. Mycobacterium tuberculosis (M.tb) singularly contributes to a significant portion of under-five deaths in middle and lower-income countries worldwide. Although the diagnostic and treatment principles remain similar in children and adults, variations in disease type and host characteristics present challenges. [10]

Infectious TB is more common in adults and older children, often confirmed through sputum testing. However, younger children typically have TB forms that are less detectable on sputum smears. Difficulty accessing specimens from children who swallow rather than expectorate sputum further complicates diagnosis. Alternative methods for collecting respiratory samples are more invasive and require specialized skills. While microbiological testing is necessary to confirm TB and assess drug sensitivity, the complexity of diagnosing TB in children poses challenges to decentralizing diagnosis to the community level.[10]

Children differ from adults TB as children much more likely to develop extra-pulmonary TB, as many as 25% of childhood TB cases are extra-pulmonary cases, compared with 16% in adults. Children are also more likely to develop other severe forms of TB including disseminated TB and TB meningitis. But the lack of an accurate “gold standard” diagnostic test for TB in young children is major challenge, and adds to the potential for both an under-diagnosis and an over-diagnosis of cases. A misplaced faith in the protective efficacy of the bacille Calmette–Guérin (BCG) vaccine (although the BCG vaccine has been shown to prevent about 60% to 90% of cases of meningeal TB and disseminated TB in young children) and lack of research and investment again make difficult to tackle childhood tuberculosis properly. [11]

Controlling TB in India encounters several hurdles, chiefly due to inadequate primary health-care infrastructure in rural areas across multiple states. The unregulated private health sector exacerbates the issue by promoting widespread, irrational use of both first-line and second-line anti-TB drugs. Furthermore, the HIV epidemic complicates TB management efforts. A lack of political commitment and corrupt administrative practices further hinder effective control measures. Addressing these obstacles demands holistic strategies prioritizing the bolstering of primary health care, regulating the private health sector, curbing HIV transmission, and fostering transparent and accountable governance. [12]

There has been a notable shift in recent times, with pediatric tuberculosis receiving increased attention within the Revised National Tuberculosis Control Program (RNTCP). Unlike traditional national TB programs, pediatric TB has consistently been a priority for RNTCP since its inception. [13] To streamline the management of pediatric TB, RNTCP, in collaboration with the Indian Academy of Pediatrics (IAP), has established

criteria for suspecting TB in children. This includes separate algorithms for diagnosing pulmonary TB and peripheral TB lymphadenitis, along with a comprehensive strategy for treatment and monitoring patients undergoing treatment. These initiatives aim to simplify the approach to pediatric TB, ensuring timely diagnosis and effective management. [14,15] As of today, India's DOTS (Directly Observed Treatment, Short-Course) program stands as the world's fastest expanding and largest initiative in terms of the number of patients initiated on treatment. It also holds the distinction of being the second-largest program globally in terms of population coverage. This underscores India's significant commitment and efforts toward combating tuberculosis, reflecting the scale and scope of the country's response to this public health challenge.[12]

To achieve the global goal of eliminating TB by 2050, as outlined in the WHO's "STOP TB" strategy, it is imperative to give equal attention to the treatment and prevention of TB in children as in adults. While BCG vaccination is a key preventive measure, its efficacy against the most common forms of childhood TB is limited and its effect wanes over time. Therefore, there is a pressing need to prioritize the screening of household contacts of adult TB patients and provide preventive drugs to young children. Shifting our focus from patient-centric care to family-centric care is essential. As India progresses towards universal access to TB prevention, diagnosis, and treatment, it is crucial not to overlook the needs of the youngest members of society. By addressing TB comprehensively and inclusively, we can work towards a future where TB is no longer a threat to public health. [11]

Thus we have planned this research to assess the clinical spectrum of patients with tuberculosis in pediatric patients.

AIMS AND OBJECTIVE

1. To study the clinical profile of children presenting with Tuberculosis.
2. To study the outcome of children with tuberculosis.

REVIEW OF LITERATURE

Presumptive Pediatric TB refers to children suspected of having TB based on symptoms such as persistent fever, cough lasting more than two weeks, and weight loss. A significant weight loss (>5% in the past three months) or failure to gain weight despite proper nutrition without any other clear cause should trigger a thorough examination and investigation, including tests for TB. [10]

Furthermore, children with presumptive TB often have a history of contact with a person who has active TB. Contact with someone with any form of active TB within the last two years could be considered significant in a symptomatic child. [10]

Clinical spectrum of pediatric TB

The clinical spectrum of childhood TB varies due to differences in the interaction between the pathogen and the host immune response. Disease severity can result from either inadequate or excessive attempts by the immune system to control the infection. Many cases of primary TB infection in children are asymptomatic, resolving on their own and often going unnoticed until later stages. In previously healthy children, what determines successful containment versus progressive disease is not fully understood, but age and immunodeficiency play significant roles.[16]

In immunocompetent adolescents, an exuberant immune response typically leads to adult-type, cavitating disease. However, in young children and/or those with HIV co-infection, poor cell-mediated immunity (CMI) allows the bacilli to proliferate unchecked, causing progressive lung damage, with or without cavity formation, and dissemination to other parts of the body. Although dissemination can occur in various sites, TB meningitis (TBM) is a common consequence of extrapulmonary TB,

typically developing three to six months after primary infection. TBM is considered the most severe form of childhood TB, with mortality or significant long-term neurological complications occurring in almost half of cases.[16]

Anatomical differences between children and adults also influence the presentation of TB. Children under five years old commonly experience complications from enlarging lymph nodes and small airways. Post-primary TB may lead to upper-lobe pulmonary consolidation and cavitation, which is more common in older children and highly infectious patients.[17]

Diagnostics

Diagnosing childhood TB presents significant challenges, primarily due to diagnostic difficulties. TB is frequently not considered in the initial differential diagnosis for children, particularly in regions with low TB prevalence. The disease can mimic various common childhood illnesses, such as pneumonia, bacterial and viral infections, malnutrition, and HIV.[18]

One of the main obstacles to accurately diagnosing active TB in children is the paucibacillary nature of the disease. Children with TB often have low levels of bacteria in their sputum, making it difficult to detect using standard diagnostic methods. Additionally, younger children produce smaller amounts of sputum, which is typically swallowed rather than expectorated, further complicating sample collection.[19]

To collect bacteriological samples, healthcare providers may resort to conducting early morning gastric washings, a procedure that can be unpleasant and requires hospital admission and overnight fasting for up to three consecutive nights. Despite these efforts, bacteriological confirmation remains the exception rather than the norm, with only 10-

15% of sputum samples revealing acid-fast bacilli (AFB), and culture results remaining negative in approximately 70% of cases with probable TB.[10]

In the absence of a definitive diagnosis, treatment is often initiated based on clinical judgment, supplemented by algorithms that consider exposure history, clinical features, chest X-ray (CXR) findings, and tuberculin skin tests (TST). These diagnostic challenges underscore the importance of considering TB in the differential diagnosis of childhood illnesses, especially in areas with high TB burden, and highlights the need for improved diagnostic tools and strategies for pediatric TB.[16]

The diagnostic algorithm outlined provides a recommended pathway for diagnosing intrathoracic TB in children. While symptoms suggestive of TB can resemble those of other diseases, proper characterization of these symptoms improves the likelihood of identifying cases of TB. Persistent cough and fever for two weeks or more, especially when accompanied by weight loss or exposure to active TB, serve as valuable clinical markers. It is crucial to accurately document weight changes and ensure standardized weighing procedures during patient evaluation.

All presumed cases of pediatric TB undergo further investigation for TB. The initial specific investigation recommended is a frontal chest X-ray. If a recent high-quality chest X-ray is available, repeat testing is not typically recommended. This represents a notable departure from previous guidelines, where a sputum smear examination was initially recommended. Which are mentioned in figure 1:[10]

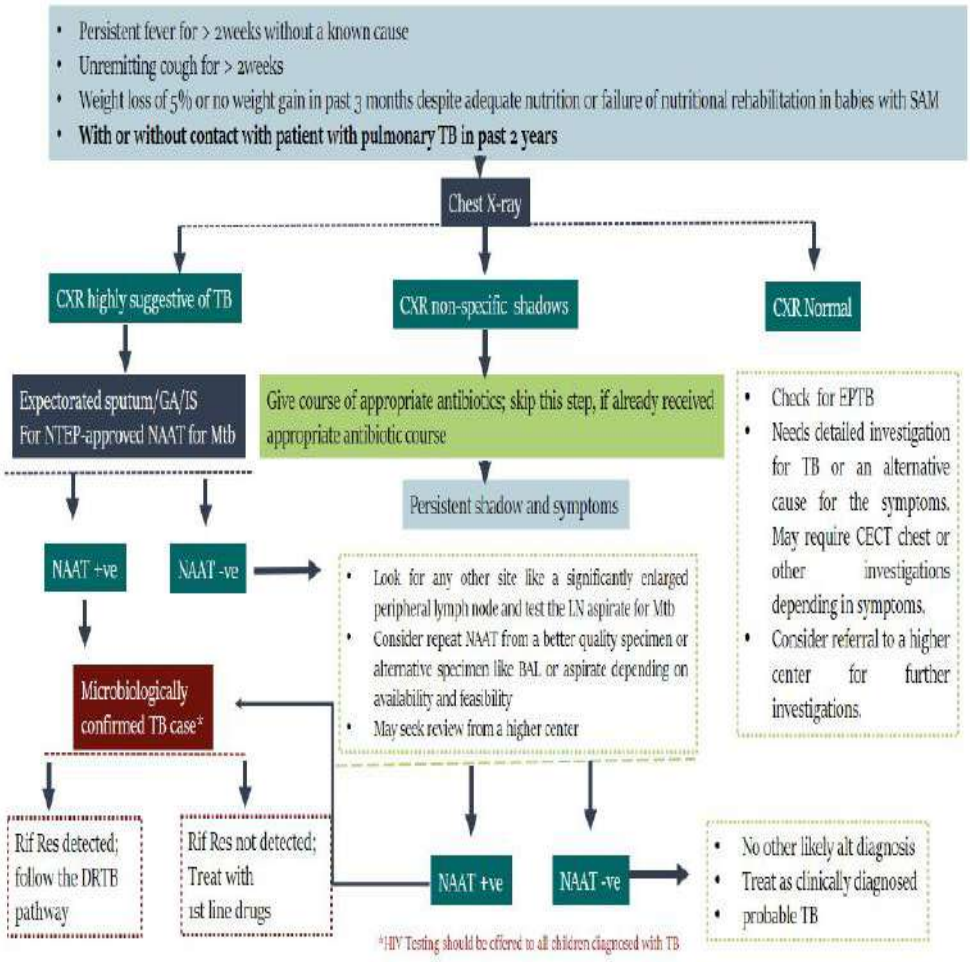
Persistent fever for > 2weeks without a known cause
Unremitting cough for > 2weeks
Weight loss of 5% or no weight gain in past 3 months despite adequate nutrition or failure of nutritional rehabilitation in babies with SAM
With or without contact with patient with pulmonary TB in past 2 years
Chest X-ray
CXR highly suggestive of TB
CXR non-specific shadows
CXR Normal
Expectorated sputum/GA/IS For NTEP-approved NAAT for Mtb
Give course of appropriate antibiotics; skip this step, if already received appropriate antibiotic course
Check for EPTB
Needs detailed investigation for TB or an alternative cause for the symptoms. May require CECT chest or other investigations depending in symptoms.
Consider referral to a higher center for further investigations.
Persistent shadow and symptoms
NAAT +ve
NAAT -ve
Look for any other site like a significantly enlarged peripheral lymph node and test the LN aspirate for Mtb
Consider repeat NAAT from a better quality specimen or alternative specimen like BAL or aspirate depending on availability and feasibility
May seek review from a higher center
Microbiologically confirmed TB case*
Rif Res detected; follow the DRTB pathway
Rif Res not detected; Treat with 1st line drugs
NAAT +ve
NAAT -ve
No other likely alt diagnosis
Treat as clinically diagnosed probable TB
*HIV Testing should be offered to all children diagnosed with TB

Figure 1: Diagnostic Algorithm for Pulmonary TB in Children [10]

The initial investigation recommended for diagnosing tuberculosis (TB) in children is a plain radiograph with a frontal view of the chest. Radiological findings highly suggestive of TB in the suggested clinical context include:

a) Miliary shadows: diffuse micronodular shadows affecting both lungs resembling a snowstorm.

b) Intrathoracic lymphadenopathy: usually seen as dense, well-circumscribed ellipsoid or rounded shadows in the hilar or mediastinal regions.

c) Chronic fibro-cavitary shadows: typically observed in the apical regions, though not exclusively.[10]

Findings such as consolidations, heterogeneous shadows, or bronchopneumonia are considered nonspecific as they may also be present in other bacterial diseases.

Chest radiography serves as an important tool to support the diagnosis of pulmonary TB in children. In relevant clinical settings, a diagnosis of TB may need to be made based on highly suggestive imaging findings, such as miliary patterns, hilar or paratracheal lymphadenopathy with or without parenchymal involvement, and fibro-cavitary lesions. It's important to note that these imaging patterns also have other possible diagnoses. Presumptive TB cases with these radiological patterns are considered probable cases and should undergo microbiological testing to confirm the diagnosis. If microbiological investigations yield negative results, these children may still be diagnosed clinically with TB, provided alternative causes are ruled out. The specificity of diagnosis in such cases increases with additional pointers such as a positive tuberculin skin test (TST) or a history of contact with TB.[10,20]

Non-specific findings on chest X-ray refer to patterns other than those highly suggestive of TB, such as consolidations, heterogeneous shadows, or bronchopneumonia. Since these abnormalities can often be associated with other causes like bacterial diseases, patients should receive a course of appropriate antibiotics (e.g., Amoxicillin or co-amoxiclav), particularly if blood counts indicate neutrophilia. However, antibiotics like Linezolid or quinolones should be avoided as they have anti-TB action. Clinical clues may prompt earlier investigation for TB in certain cases; for instance, widespread bacterial pneumonia is unlikely to be clinically silent, whereas mycobacterial pneumonia may exhibit disproportionately fewer clinical findings compared to the extent of radiological changes.[10]

If non-specific radiological patterns persist despite adequate antibiotic therapy in a symptomatic child, further evaluation with Induced Sputum (IS) or Gastric Aspirate (GA) for M. tuberculosis (M.tb) is necessary.If negative by nucleic acid amplification test (NAAT) or culture, additional assessments such as CT chest and flexible bronchoscopy for persistent pneumonia are warranted. In such cases, the list of potential diagnoses is extensive, with TB being one possibility among others. Referral for further evaluation is essential, and initiating Anti-Tubercular Treatment (ATT) without ruling out other diseases is not justified.[10]

In patients previously treated for TB, chest radiographs may reveal post-TB changes such as opacities secondary to pleural thickening, fibro-atelectatic changes, or bronchiectasis areas. Typically asymptomatic, except in cases of post-TB bronchiectasis where symptoms of suppurative lung disease may manifest, these cases require expert evaluation to confirm disease recurrence if new symptoms arise after successful treatment.[10]

It's crucial to acknowledge that various factors can contribute to both under and overdiagnosis of TB on chest radiology. Key issues related to potential errors include technical aspects like film exposure, rotation, motion blur, as well as inter and intra-individual variations in interpretation, and errors due to artifacts or confounding factors like thymic shadow.[10]

CT scans [10]

While CT scans can be necessary for evaluating children with persistent pneumonia or fever without an apparent focus, their judicious use is essential due to cost and radiation concerns. However, CT scans can provide valuable information, with certain patterns suggestive of TB including necrotic mediastinal lymphadenopathy, centrilobular nodules

with a tree-in-bud pattern, and cavities with surrounding consolidations. Additionally, chest CT scans may facilitate CT-guided biopsy for tissue diagnosis.

Ultrasonography (USG) of the chest is beneficial for assessing pleural fluid collections, differentiating thymus and anterior lymph nodes, and identifying optimal locations for aspiration, fine needle aspiration cytology, or biopsy in peripheral lesions.[10]

Microbial testing [10]

The new approach in TB management involves upfront testing of all TB patients for resistance, particularly to rifampicin, using NTEP-approved rapid nucleic acid amplification tests (NAAT) on relevant body specimens. For pulmonary TB, respiratory secretions such as self-expectorated sputum, induced sputum, gastric aspirate, or lavage are suitable samples for testing. Given the challenges in accessing samples from children, it is advisable to target specimen collection among them following a positive screening on chest radiography.

When the screening chest imaging reveals highly suggestive radiological features, the patient should undergo immediate specimen collection and testing. However, if the screening radiograph shows non-specific findings, as described previously, respiratory specimen collection for M. tuberculosis is recommended only if symptoms persist despite a full seven days' course of a potent, suitable antibiotic (such as Amoxicillin or Co-amoxiclav).

Exceptions to this approach may be warranted in cases of clinical urgency or when the child has a high probability of having tuberculosis. In such situations, immediate specimen collection and testing may be necessary, regardless of the duration of antibiotic treatment.

For diagnosing TB in children who cannot expectorate sputum, alternative methods are employed. Gastric aspirate, collected from the stomach after fasting (usually overnight), is a preferred specimen. Alternatively, induced sputum can be obtained in children who cannot produce sputum, with acceptable yields and without prolonged fasting. A good sputum sample should be mucoid or mucopurulent, with minimal oral or nasopharyngeal material, and collected in a sterile container after rinsing the oral cavity.[10]

These specimens, along with samples from extra-pulmonary sites, are tested using NTEP-approved rapid nucleic acid amplification tests (NAAT) like Xpert Rif™ or Truenat™ M.tb Plus. These tests can detect M.tb and resistance to rifampicin. Line probe assays (LPAs) like MTBDRplus™ and MTBDRsl™ are also available for drug resistance testing. LPAs are recommended for smear-positive specimens or culture isolates.[10]

While newer rapid molecular tests have high specificity, they perform poorly in culture-negative cases. Pleural or ascitic fluid samples yield poor results with rapid NAAT tests compared to respiratory specimens or lymph node aspirates. If symptoms persist despite negative NAAT results, further workup for diagnosing persistent pneumonia is advised.[10]

In cases of Rifampicin resistance detected by NAAT, confirmatory testing with LPAs is performed. Discordance between NAAT and LPA results is resolved by retesting or further analysis. Xpert Ultra, increasingly used in the private sector, provides machine printouts of results; however, clinical correlation and additional tests may be necessary due to uncertainty in trace calls.[10]

Skin Test and Interferon-Gamma release assays (IGRAs) and Other Tests for TB

The Tuberculin Skin Test (TST), which involves an intradermal injection of Purified Protein Derivative (PPD), is currently recommended for all

diagnostic purposes using 2TU PPD RT23. A positive Mantoux or PPD skin test is defined as an induration of 10 mm or more, or 5 mm in HIV co-infected individuals. However, due to the unavailability of the original lot of RT23 PPD, interpretation may be challenging with commercially available products.[21]

Interferon-Gamma Release Assays (IGRAs), such as TB Quantiferon Gold™ and TB Spot™, provide in vitro measures of M.tb hypersensitivity. Unlike TST, they do not require a repeat visit for test reading and do not cross-react with BCG vaccination. However, they need to be rapidly transferred to the lab and are relatively expensive. A positive IGRA indicates TB infection but does not confirm disease presence.[21]

Other diagnostics like serology, PCR tests, and BCG tests are not recommended for TB diagnosis due to inaccuracy. The ESR test, although commonly used, lacks specificity and is affected by various factors other than TB.[10]

C-Tb, a next-generation skin test for TB detection developed by SSI Copenhagen, offers IGRA-like performance in a skin test format. It uses a universal 5 mm cutoff to differentiate infected individuals from uninfected ones. However, it is currently unavailable commercially and pending approval for adoption in the program.[10]

Extrapulmonary TB

Extrapulmonary TB (EPTB) encompasses any case of TB involving organs other than the lungs, such as lymph nodes, pleura, bones, joints, intestines, genitourinary tract, and the meninges of the brain.[22]

Presumptive EPTB refers to the presence of symptoms and signs specific to the affected organ, such as lymph node swelling, joint pain and

swelling, neck stiffness, disorientation, along with constitutional symptoms like significant weight loss, persistent fever, and night sweats. It is essential to seek microbiological confirmation in presumptive EPTB cases. Appropriate specimens from the suspected sites of involvement should be obtained for nucleic acid amplification tests (NAAT), smear microscopy, culture, drug susceptibility testing (DST), histopathological examination, etc., based on feasibility.[22]

Supportive investigations such as chest X-ray and ultrasonography (USG) can aid in diagnosing EPTB. However, the sensitivity of NAAT for M.tb detection varies depending on the specimen type. It is moderately high in pus, aspirate/biopsy specimens from lymph nodes and other tissues, and cerebrospinal fluid (CSF), but poor in pericardial, ascitic, and synovial fluid samples, and even poorer in pleural fluid. A positive result by culture or NAAT provides confirmation, but a negative result cannot rule out TB due to the tests' inadequate sensitivity in extrapulmonary specimens.[10]

If initial investigations yield negative results or if appropriate specimens are unavailable, consultation with a specialist is recommended. Additional tests such as histopathology, radiology, cytology, etc., may be necessary to establish a diagnosis. In such cases, diagnosis often relies on suggestive history, presentation, and supportive investigations. It is crucial to diligently rule out alternative diagnoses in patients clinically diagnosed with TB.[10]

TB Lymphadenitis

Lymph node TB is a prevalent form of EPTB, commonly affecting cervical lymph nodes, especially in the age group of 5-9 years. Enlarging masses over weeks to months are typical presenting features. Cervical lymph nodes, including jugular, posterior triangle, and supraclavicular nodes, are

commonly affected, with occasional involvement of axillary and inguinal nodes. Some patients may experience systemic symptoms.[10,23]

A clinical diagnosis of lymph node TB is based on progressive enlargement of lymph nodes for more than two weeks, which are firm, minimally tender or non-tender, and may or may not fluctuate. Affected nodes can become matted, form a cold abscess, rupture, and develop chronic sinus. However, differential diagnoses such as infections or malignancies should also be considered, as large lymph nodes may be present due to various causes.[10]

Histopathology is typically considered the gold standard for diagnosing enlarged lymph nodes. Fine Needle Aspiration Cytology (FNAC) is an alternative test that usually provides accurate diagnosis and correlates well with biopsy results in over 90% of cases. However, both tests require a skilled pathologist for interpretation and may not always be feasible in peripheral healthcare settings. Additionally, needle aspirates should be obtained cautiously to avoid complications.[24]

Aspirates from lymph nodes can indeed be tested for the presence of acid-fast bacilli (AFB) or nucleic acid amplification tests (NAAT) to diagnose TB in a more decentralized fashion, without requiring the expertise of a skilled pathologist. However, since there are better alternatives available and the yield of smear for AFB or NAAT is moderate at best, all cases negative for these tests should be subjected to detailed fine needle aspiration cytology (FNAC) or histopathology.[10]

In cases of tuberculosis, histopathology typically reveals epithelioid granuloma with or without central acellular necrosis. This characteristic histological pattern supports the diagnosis of TB, providing valuable information even in cases where AFB or NAAT tests yield negative results.

Therefore, FNAC or histopathology remains crucial for confirming TB diagnosis and guiding appropriate treatment.

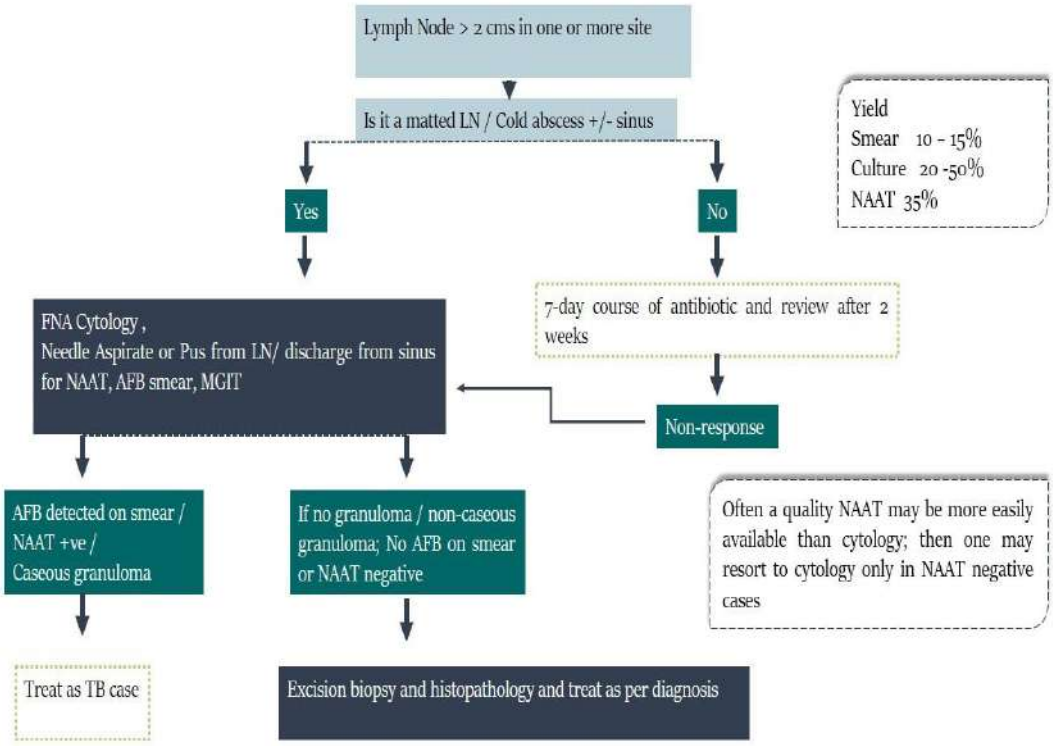
Lymph Node > 2 cms in one or more site
Is it a matted LN / Cold abscess +/- sinus
Yield
Smear 10 - 15%
Culture 20 -50%
NAAT 35%
Yes
No
7-day course of antibiotic and review after 2 weeks
FNA Cytology ,
Needle Aspirate or Pus from LN/ discharge from sinus for NAAT, AFB smear, MGIT
Non-response
AFB detected on smear / NAAT +ve / Caseous granuloma
If no granuloma / non-caseous granuloma; No AFB on smear or NAAT negative
Often a quality NAAT may be more easily available than cytology; then one may resort to cytology only in NAAT negative cases
Treat as TB case
Excision biopsy and histopathology and treat as per diagnosis

Figure: 2 Diagnostic Algorithm for Tubercular Lymphadenitis [10]

Abdominal TB involves various sites like intestines, lymph nodes, peritoneum, and can be disseminated. Symptoms include abdominal pain, fever, weight loss, and physical signs like ascites. Diagnosis requires a multimodal approach including imaging, endoscopy, and tissue biopsy. Ultrasonography and CT scans are valuable for detection. Peritoneoscopy can provide high sensitivity and specificity. Diagnosis is challenging due to variable symptoms and low microbiological yield. Misdiagnosis is common, especially in children. [10,25]

Diagnosing abdominal TB is challenging due to its nonspecific symptoms, low yield in microbiological tests, and the need for multiple investigations.

Incorrect diagnoses can lead to complications. In many cases, there's inadequate evidence to begin anti-tubercular treatment (ATT). Children with fever, weight loss, or functional abdominal pain may be misdiagnosed based on lymph node findings on abdominal ultrasound. Chronic diarrhea is also often wrongly attributed to abdominal TB without proper evaluation.

Neurological TB, like TB meningitis, is severe and can lead to mortality if untreated. It typically progresses through stages and requires prompt treatment for better outcomes.

The clinical presentation of TB meningitis is divided into three stages. Typically, the disease progresses gradually over several weeks from stage one to three, although in infants and young children, it may progress rapidly over just a few days. The stage at which treatment begins can significantly influence the prognosis. Early detection and prompt initiation of treatment are crucial for better outcomes.[10,26]

Stage I typically lasts 1 to 2 weeks and presents with nonspecific symptoms such as fever, headache, irritability or drowsiness, malaise, anorexia, inadequate weight gain or weight loss, and stagnation or regression of developmental milestones.

Stage II begins abruptly and is characterized by increased intracranial pressure, meningeal irritability, and vasculitis without marked changes in sensorium. Clinical features include lethargy, nuchal rigidity, Kernig and Brudzinski signs, seizures, hypertonia, vomiting, cranial nerve palsies with basal meningitis, and other focal neurological deficits.

Stage III is marked by coma, hemiplegia or paraplegia, decerebrate posturing, and deterioration in vital signs.[10]

In TB meningitis, cerebrospinal fluid (CSF) tap typically yields clear fluid with a leukocyte count ranging from 10 to 500 cells/mm3,predominantly lymphocytes. CSF glucose is usually below 40mg/dl (CSF glucose / blood glucose ratio < 0.5), while protein levels are elevated, often exceeding 100 mg/dl. Rapid nucleic acid amplification tests (NAAT) may be positive in around 30-40% of cases, while Tuberculin Skin Test may not react in 50%

of cases. Chest X-ray abnormalities are observed in 20-50% of cases. Diagnosis may also be confirmed by concomitant extra-neural disease.[10]

Computed tomography (CT) or magnetic resonance imaging (MRI) of the head is the initial diagnostic modality, revealing features such as basal meningeal enhancement, hydrocephalus, tuberculoma, infarcts (especially in the basal ganglia), and pre-contrast basal hyperdensity. MRI with contrast demonstrates higher sensitivity, particularly for detecting meningeal enhancements, infarcts, and tuberculomas, including lesions in the brain stem.[10,27]

Magnetic resonance imaging (MRI) is typically preferred over computed tomography (CT) when suspicion for tuberculosis meningitis is high or when CT results are inconclusive. Other conditions such as cryptococcal meningitis, cytomegalovirus encephalitis, toxoplasmosis, sarcoidosis, meningeal metastases, and lymphoma can produce similar radiological findings. Therefore, MRI provides greater detail and sensitivity in distinguishing between these different etiologies, aiding in accurate diagnosis and appropriate management.[10]

MANAGEMENT [28]

Table: 1 First-line drugs for the treatment of tuberculosis in children

Drug	Dosage form(s)	Daily dose (mg/kg/day)	Twice-wkly dose (mg/kg/dose)	Maximum daily dose
Etham-butol	Tablets: 100 mg, 400 mg	20–25	50	2.5 g
INH[a,b]	Scored tablets: 100 mg, 300 mg Syrup[c]: 10 mg/ml	10–15[b]	20–30	Daily, 300 mg; twice wkly, 900 mg
PZA	Scored tablets: 500 mg	30–40	50	2 g
RIF[a]	Capsules:150mg,300 mgSyrup(formulated in syrup from capsules)	10–20	10–20	Daily, 600 mg; twice wkly, 600 mg

[a]Rifamate is a capsule containing 150 mg of INH and 300 mg of RIF. Two capsules provide the usual adult daily doses of each drug.
[b]When INH is used in combination with RIF, the incidence of hepatotoxicity increases if the INH dose exceeds 10 mg/kg/day.
[c]Most experts advise against the use of INH syrup due to instability and a high rate of gastrointestinal adverse reaction (diarrhea, cramps) when more than 5 ml is given.[28]

Studies related to the same

A study was conducted by Verma et al. (2014) in Gwalior to evaluate the clinical profile of tuberculosis (TB) in infants under the age of five. They selected 77 cases from the in-patient department that were diagnosed with tuberculosis. Approximately 70% of the participants in the study were between the ages of two and five. The preponderance of cases (70.13%) were CNS tuberculosis, with intrathoracic (16.88%), disseminated (6.49%), abdominal (5.19%), and lymphoid (1.29%) categories following. The disease status of children was significantly influenced by severe malnutrition, low socioeconomic status, and parental illiteracy, which were identified as significant epidemiological factors. The authors concluded that paediatric tuberculosis (TB) was neglected in the National Tuberculosis Control Programme (NTCP) until the Revised National Tuberculosis Control Programme (RNTCP) was implemented. They observed a rise in the number of childhood cases in conjunction with the spread of HIV infection. The importance of early diagnosis and prompt suspicion in the management of this epidemic was underscored.[29]

Goyal et al. (2014) conducted a study on 45 children with pulmonary tuberculosis (TB) over a 12-month period, aiming to compare the clinical profiles of various types of pulmonary TB and associated factors. The mean age of the children was 5.4 ± 3.7 years, with a male-to-female ratio of 32:13. Common clinical features included fever (80%), cough (66.7%),

and both loss of appetite and malnutrition (40%). Raised erythrocyte sedimentation rate (ESR) was observed in 80% of the patients. Among the children, 93.3% had received BCG vaccination, and 59.5% tested positive on the tuberculin skin test (TST). The distribution of TB types was as follows: primary complex in 48.9%, primary progressive TB in 37.8%, and cavitary TB in 8.9% of the patients. Anemia and thrombocytosis were significantly associated with cavitary lesions. In children aged ≤5 years, primary complex TB was most common, followed by primary progressive and cavitary lesions. Conversely, in children aged >5 years, cavitary lesions were more frequent, followed by primary progressive TB and primary complex. The study concluded that primary complex is the most common presentation of pulmonary TB, predominantly seen in children under 5 years, while cavitary lesions are more common in older children.[30]

In 2017, Muley et al. examined the clinical characteristics of children tuberculosis and tracked the results of treatment over a six-month period. The inquiry was carried out at the Department of Paediatrics in Dhiraj Hospital located in Piparia. The recruitment process took place between February 2014 and February 2015. Among the 71 patients in the study population, there was a higher proportion of males (60.56%, n=43) compared to females (39.44%, n=28). The majority of patients were distributed across the age groups of under 6 years (32.4%, n=23) and over 10 years (38.0%, n=27). The study comprised 21 patients, accounting for 29.6% of the total, aged between six and ten years. Extra-pulmonary tuberculosis was the most common kind, accounting for 60.56% (n=43) of cases, whereas pulmonary tuberculosis closely followed at 39.43% (n=28). The most common presenting symptoms were non-specific, such as fever (82.5%, n=66). The other symptoms included cough (33.8%, n=24), altered sensorium (19.71%, n=14), and edoema (15.5%). Among the 50 patients that were monitored, 44 (88.0%)

responded positively to treatment, three (6.0%) died during the treatment period, and three (6.0%) did not show any signs of recovery.[31]

Pereira et al (2016) did a study to observe and describe the clinical characteristics and results of children with tuberculosis (TB) between the ages of 0 and 12 years in a specialised hospital in Mumbai, India. The findings indicated that of the 30 children diagnosed with tuberculosis (TB), 3 (10%) were younger than 1 year, 8 (26.6%) were between the ages of 1 and 5 years, and 19 (63.3%) were older than 5 years. The male to female ratio was 13:17. Extra-pulmonary tuberculosis had a higher prevalence rate (63.3%) compared to pulmonary tuberculosis (36.6%). Out of the total number of children, 20 (66.6%) had a prior history of contact with tuberculosis in adults, 29 (96.6%) received the BCG vaccine, and 10 (33.3%) were underweight. The prevalent clinical manifestations included cough (53.3%), fever (46.6%), weight loss (46.6%), and lymphadenopathy (33.3%). 46.6% of individuals exhibited anaemia, whereas 73.3% had an elevated ESR. None of the 30 children tested positive for HIV antibodies. Out of the 30 children, 16 of them (53.3%) had a positive tuberculin sensitivity test. Two children (6.6%) were observed to have drug-resistant tuberculosis. All 30 instances achieved full recovery using their initial treatment plan.[32]

Shah et al. (2020) did a study to provide a detailed description of the clinical characteristics of tuberculosis (TB) in children across different age groups. They diagnosed a total of 135 children with TB during the study period. The average age at presentation was 5.3 ± 3.5 years. The prevalent clinical manifestations were fever in 112 children (83%), cough in 63 (46.7%), and loss of appetite in 51 (37.8%). Analysis of biochemical data revealed elevated erythrocyte sedimentation rate (ESR) levels in 72 out of 97 cases (74.22%). The majority of children (89.6%) had been administered the BacilleCalmette–Guérin (BCG) immunisation, while 44

(32.6%) tested positive for the tuberculin skin test (TST), and 58 (43%) were found to be malnourished. The distribution of TB types among the patients was as follows: pulmonary TB was observed in 49 individuals (36.3%), neuro TB in 20 individuals (14.8%), TB lymphadenopathy in 12 individuals (8.9%), and abdominal TB, TB serositis, and latent TB in 11 instances (8.2%) each. 8 instances (5.9%) exhibited musculoskeletal involvement, while 6 cases (4.4%) presented with the disseminated form. In addition, two children were diagnosed with BCGosis and an illness caused by atypical mycobacterium. The statistical analysis showed that fever (P = 0.002) and elevated ESR (P = 0.045) were less prevalent in abdominal TB and disseminated TB. On the other hand, loss of appetite was more common in disseminated TB and least common in abdominal TB (P = 0.02). The results emphasise the wide range of ways in which tuberculosis (TB) can manifest in children and the significance of taking into account different types of TB during the diagnosis procedure.[33]

Kumar et al. (2020) conducted an observational cross-sectional study over six months at a hospital in North India to evaluate the prevalence and profile of childhood tuberculosis (TB) and identify associated risk factors. The study found a prevalence rate of 2.3% among hospitalized children suspected of having TB. Among these cases, 66.5% were males and 33.5% were females, with the majority being older than eight years. A known history of contact with a TB patient was present in only 31.1% of the cases, while the tuberculin skin test was positive in 53.1%. Pulmonary TB was the most common form, observed in 45.5% of the children, followed by neurological TB at 42.8%, abdominal TB at 6.5%, tuberculous lymphadenitis at 2.6%, and other types at 2.6%. Malnutrition emerged as a significant contributing factor, affecting 91.9% of the TB cases. The study also noted a mortality rate of 9.6% among the affected children. These findings underscore the importance of addressing malnutrition and

implementing targeted interventions to reduce the prevalence and improve the prognosis of childhood TB.[34]

Ksoo et al (2023) conducted a retrospective analysis of the clinical, radiological, and bacteriological profiles of children with tuberculosis at a tertiary health care facility. The analysis encompassed a total of 150 offspring, with a male-to-female ratio of 1.1:1. The mean age of the cases was 9.3 ± 4.4 years, with the preponderance of cases being under five years old (n=46) and 11 to 15 years old (n=45). Fever was a prevalent symptom (70%). In our study, extra-pulmonary tuberculosis was a frequent finding, with 31.3% of cases exhibiting disseminated tuberculosis, 30.6% exhibiting isolated central nervous system (CNS) tuberculosis, and 46 cases (40.7%) exhibiting all CNS tuberculosis with dissemination. Total pulmonary cases, including dissemination, were observed in 60 cases (40%), while isolated pulmonary tuberculosis was observed in 16.7% of cases. In 23% of cases, a bacteriological diagnosis was rendered. The overall mortality rate was 9.3%, with a p-value of 0.004 for mortality in CNS TB and a p-value of 0.001 for mortality in under-five years. Mortality in CNS TB was 13%, which was significantly higher than mortality in other conditions. [35]

Tripathi et al. (2023) conducted a hospital-based study to assess the clinical profile and outcomes of tuberculosis (TB) in children under 14 years of age. The study found an overall mortality rate of 13.8%, with 82% of the deceased children being under 5 years old. According to WHO criteria, 52.5% of children under 5 were severely undernourished, and 20% were moderately undernourished. A history of contact with TB was present in 66% of cases, a BCG scar was observed in 91.3%, and the tuberculin sensitivity test was positive in 56%. The most common presenting complaints were fever, cough, and weight loss. The majority of cases (75%) involved extrapulmonary TB, with neurotuberculosis being the most common form and associated with the highest mortality rate

(70%). Microbiological confirmation of TB was achieved in only 8.8% of cases. These findings underscore the critical need for early detection, adequate nutrition, and effective treatment strategies to improve TB outcomes in children.[36]

Yeredla et al in 2023 conducted a cross-sectional study to evaluate the clinical profile of childhood tuberculosis in 75 patients aged 6 months to 12 years. About 50% of the children were under 5 years old, and 39% were 8-12 years old, with a male-to-female ratio of 1:1.02. Socioeconomic data showed 36% from lower-class and 33.33% from middle-class families. Among the patients, 75% were malnourished, with 36% in Grade I and 53.33% having a Stengen score of 5-6. Diagnostic findings included Acid Fast Bacilli in 1.33%, tubercles in 18.66%, a positive Mantoux test in 82.66%, and suggestive radiology in 62.66%. Clinically, 90% had a fever, 77% had a cough, and 37.33% experienced weight loss. Pulmonary TB was present in 22.66% of cases, while 77.33% had extrapulmonary TB. The most common extrapulmonary manifestation was lymphadenopathy (40%), including cervical (24%), axillary (12%), submandibular (2.66%), and supraclavicular (1.33%) nodes. Pleural effusion affected 29.33%.[37]

MATERIAL AND METHOD

This is a prospective observational study conducted in the Department of Paediatrics at Dayanand Medical College and Hospital, Ludhiana. All patients diagnosed with tuberculosis (TB) based on clinical features and outcomes after receiving anti-tuberculosis treatment (ATT) were included as subjects, following informed consent from each patient. The study commenced after obtaining approval from the Institutional Ethics Committee.

SOURCE OF DATA:

The data was sourced from patients aged 0-18 years, diagnosed with TB in the outpatient department (OPD) or admitted to the pediatric ward in the Department of Paediatrics, Ludhiana.

METHOD OF COLLECTION OF DATA:

Data was collected from consenting participants who met the inclusion criteria, after briefing them about the purpose of the study. The proforma included demographic details of the participants and information related to their primary diagnosis and ongoing treatment. A structured proforma, designed based on the study's objectives, was used to assess the clinical features of TB.

INCLUSION CRITERIA:

1. Patients between 0-18 years of age, diagnosed with TB.
2. Any patient on ATT based on clinical features.
3. Any patient positive with CBNAAT.
4. Any patient positive with AFB sputum.
5. Any patient culture positive for TB.

EXCLUSION CRITERIA:

1. Patients older than 18 years.
2. Non-consenting patients or their attendants.

INVESTIGATIONS CONDUCTED ON PATIENTS:

- **Blood Tests:** Complete Blood Count (CBC), Liver Function Tests (LFT), Renal Function Tests (RFT), C - reactive protein (CRP), Blood culture, and sensitivity.
- **Radiology:** Chest X-ray.
- **Microbiology:** CBNAAT (Cartridge Based Nucleic Acid Amplification Test) sputum, CBNAAT gastric aspirate.
- **Other Tests:**Mantoux test.

This comprehensive approach ensured thorough data collection and analysis to understand the clinical features and treatment outcomes of TB in the pediatric population.

OBSERVATION AND RESULTS

Table 2: Distribution of children with TB in present study according to geographic distribution

Geographic as per state		Frequency	Percent
Jammu Kashmir		4	5.33%
Punjab		71	94.67%
Distribution as per regions of Punjab			
Majha	Gurdaspur	5	7.04%
	Amritsar	1	1.41%
Doaba	Hoshiarpur	1	1.41%
	Jalandhar	12	16.90%
Malwa	Ludhiana	41	57.75%
	Bathinda	2	2.82%
	Patiala	2	2.82%
	Moga	3	4.23%
	Barnala	1	1.41%
	Fazilka	2	2.82%
Total		71	100.00%

The study included 75 TB patients, with 4 patients (5.33%) from Jammu & Kashmir and 71 patients (94.67%) from Punjab. This distribution indicates that Ludhiana, Jalandhar, and Gurdaspur are significant areas of concern for TB in Punjab, necessitating focused TB control and prevention efforts in these districts.

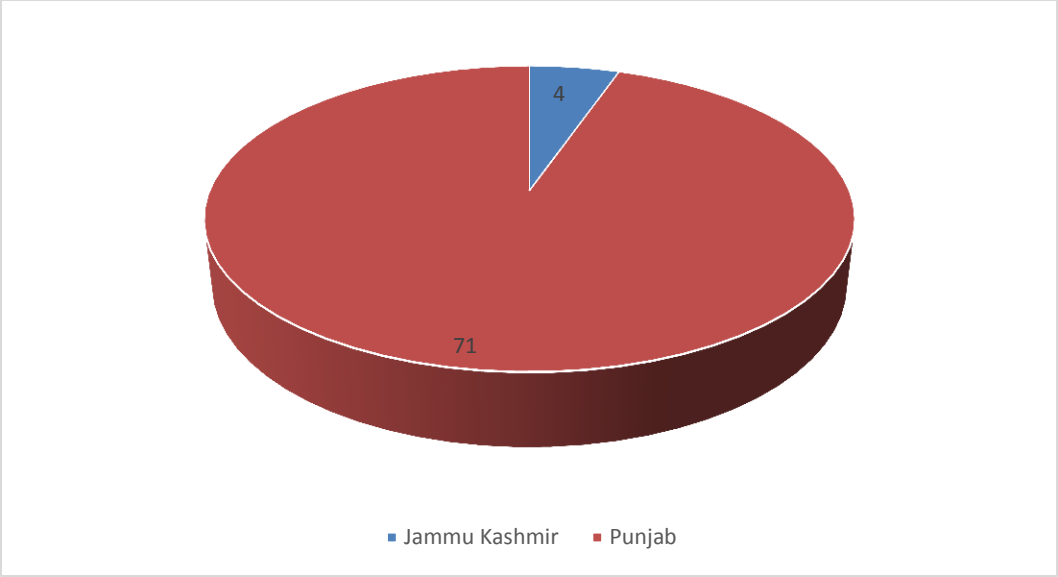

Figure 3: Geographic distribution as per state in present study

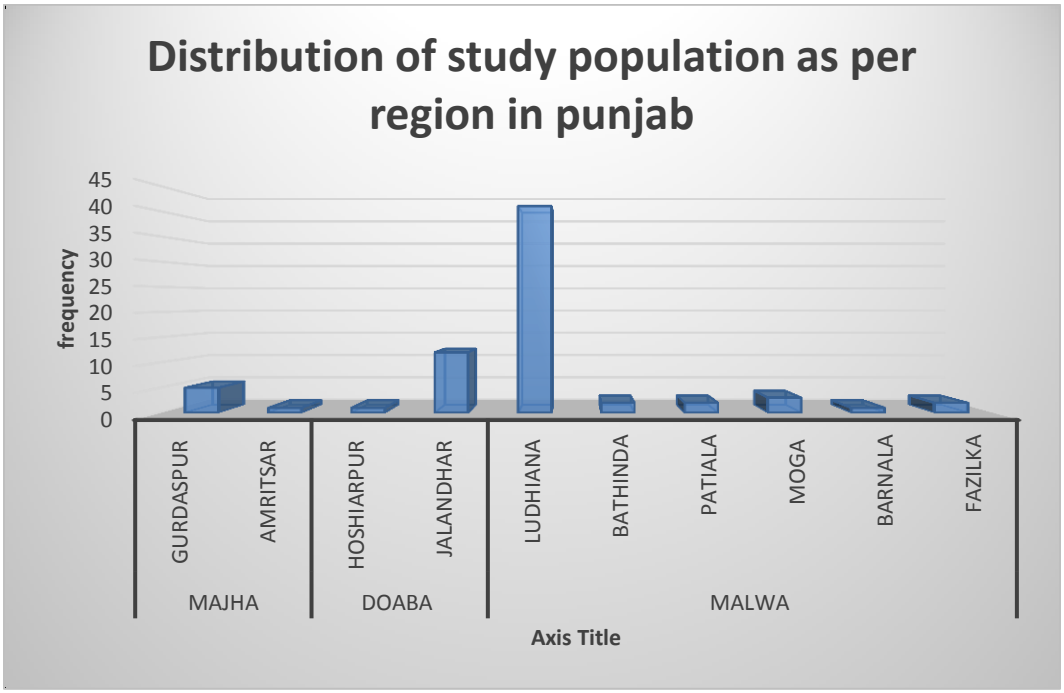

Figure 4: Geographic distribution within state as per study

Table 3: Geographic distribution within city as per study

Location within Ludhiana	Frequency	Percent
East Ludhiana	28	68.29%
West Ludhiana	4	9.76%
North Ludhiana	4	9.76%
South Ludhiana	5	12.20%
Total	41	100.00%

The data indicates that East Ludhiana has the highest frequency, accounting for 28 out of 41 instances, which corresponds to 68.29% of the total.

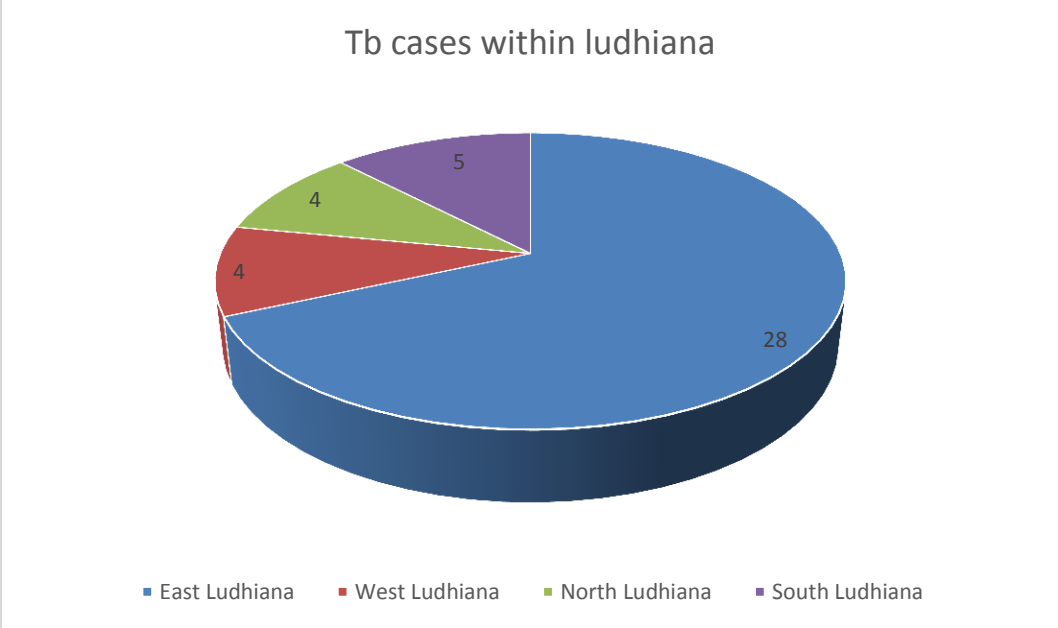

Figure 5: Geographic distribution within city as per study

Table 4: Distribution of patients according to age

Age groups	Frequency	Percent
<=5 years	10	13.3
6-10 years	14	18.7
11-15 years	36	48
>15 years	15	20
Total	75	100

The data shows the frequency distribution of individuals across different age groups. The ≤5 years group has 10 individuals, the 6-10 years group has 14, the 11-15 years group has the highest frequency with 36 individuals, and the >15 years group has 15 individuals. This indicates that most individuals fall within the 11-15 years age range, with fewer in the younger and older age groups.

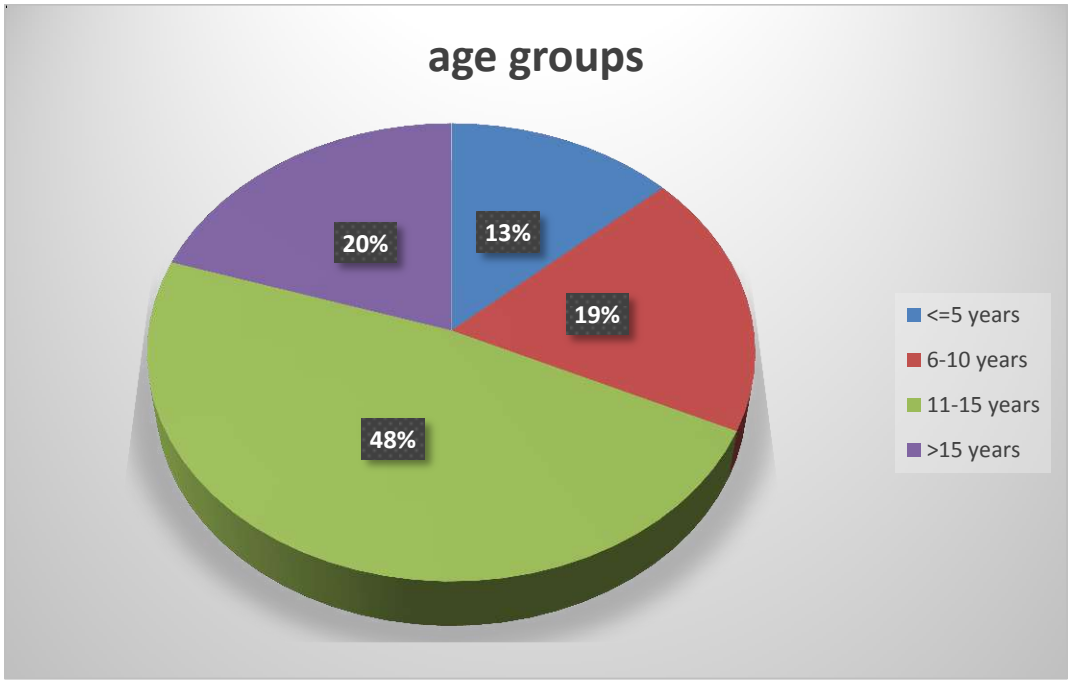

Figure 6: Distribution of patients according to age

Table 5: Mean age of the patients

	Mean	SD
Age	11.53	4.613

The mean age of the patients was 11.53±4.61 years.

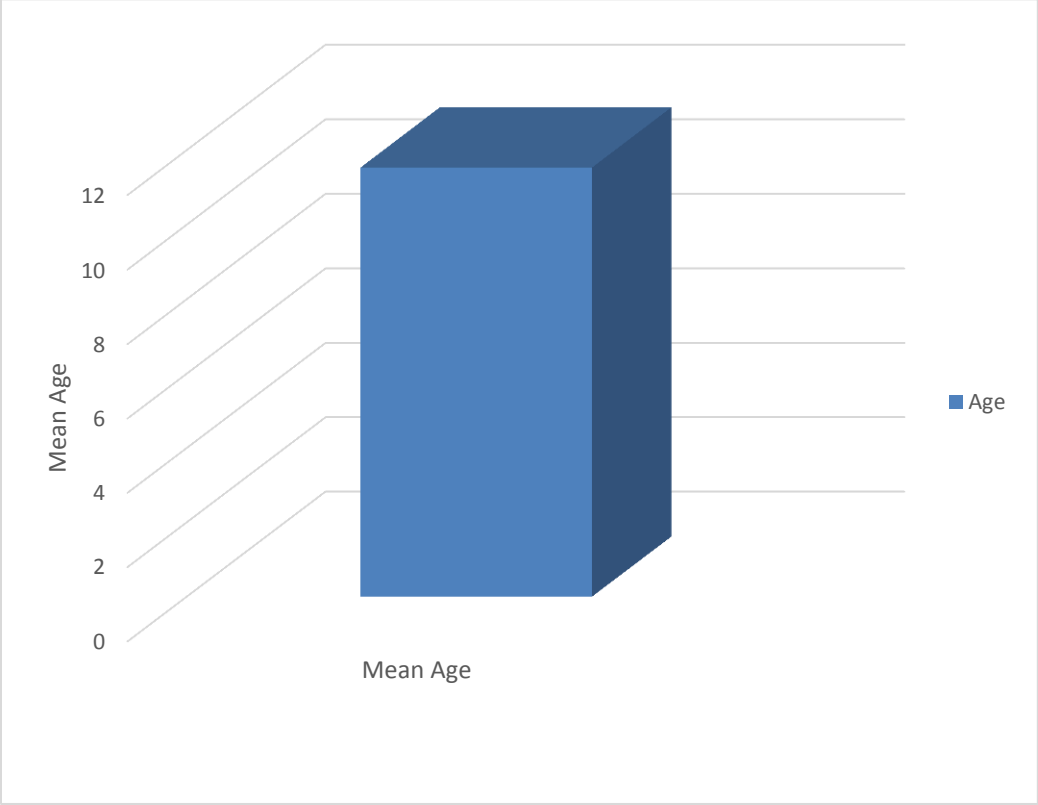

Figure 7: Mean age of the patients

Table 6: Distribution of patients according to Sex

Sex	Frequency	Percent
Female	36	48.0
Male	39	52.0
	75	100.0

The study consisted of 36(48%) females and 39(52%) males.

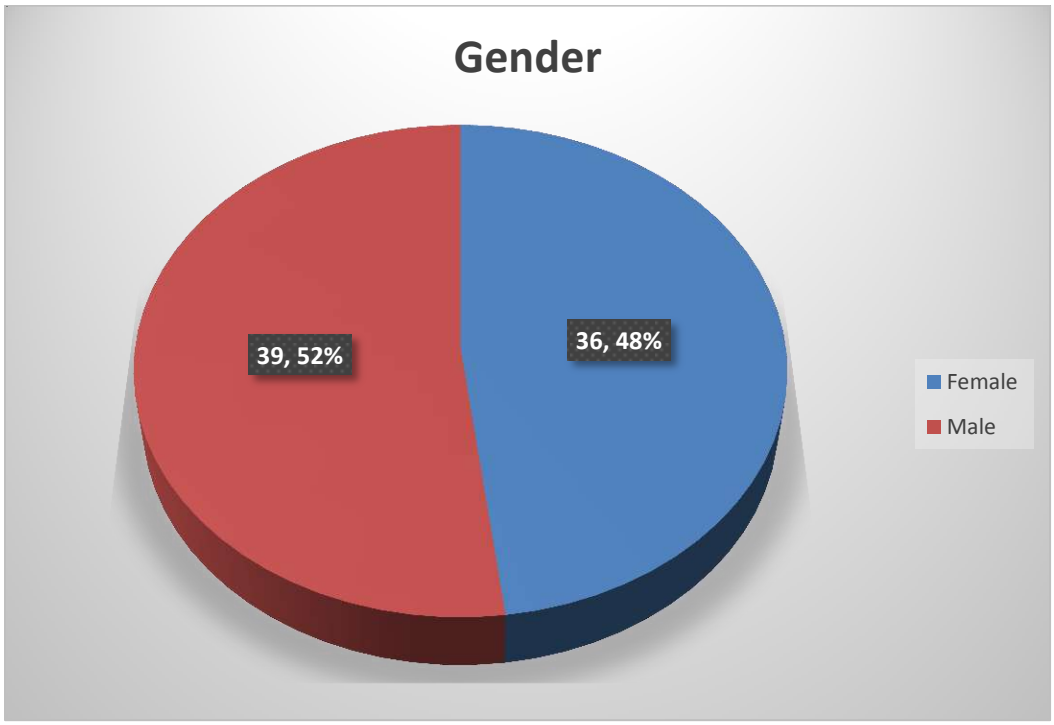

Figure 8: Distribution of patients according to sex

Table 7: Distribution of patients according to symptoms

symptoms	frequency	%age
Fever	69	92.00%
Loss appetite	55	73.30%
weight loss	49	65.30%
Cough	33	44.00%
Pain abdomen	29	38.70%
vomiting	28	37.30%
seizures	27	36.00%
headache	24	32.00%
loose stools	3	4.00%
Back pain	2	2.70%
swelling	1	1.30%

Majority of patients with TB reported fever with 69(92%) patients followed by loss of appetite which was seen in 55(73.3%) patients, weight loss seen in 49(65.3%) patients.

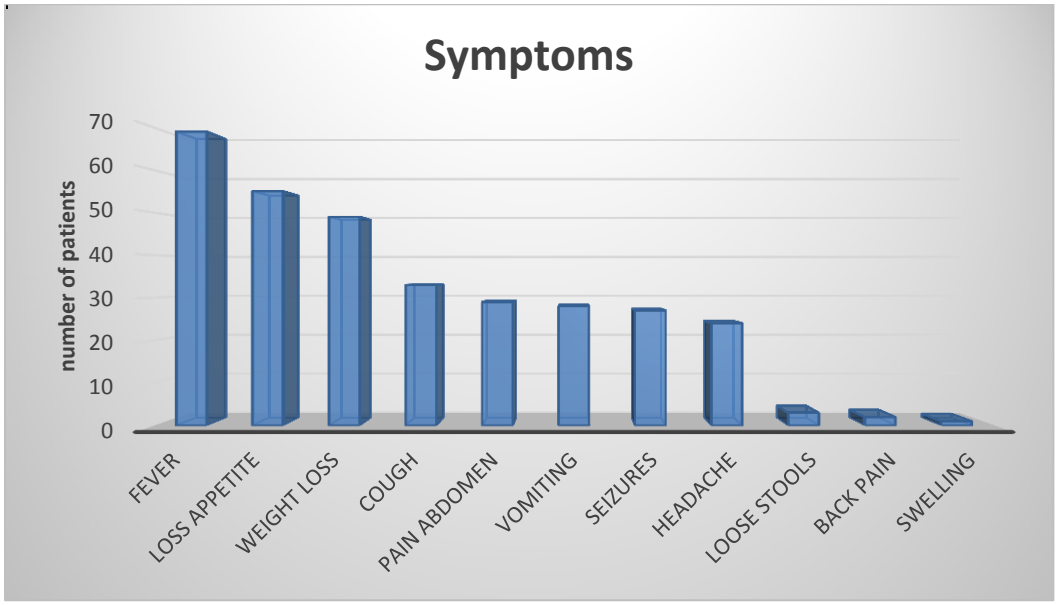

Figure 9: Distribution of patients according to symptoms

Table 8: Distribution of patients according to contact tracing

Contact tracing	Frequency	Percent
Positive	13	17.3
Negative	62	82.7
Total	75	100

Out of a total of 75 individuals, 13 (17.3%) tested positive for TB through contact tracing, while the majority, 62 individuals (82.7%), tested negative.

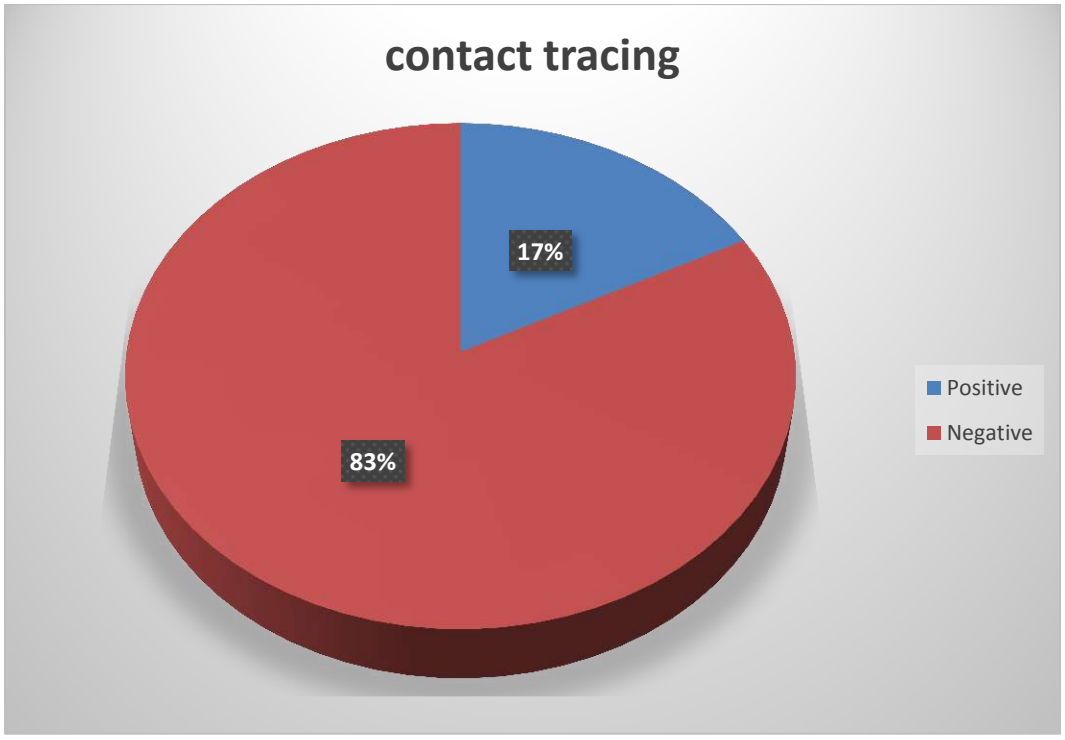

Figure 10: Distribution of patients according to contact tracing

Table 9: Distribution of Tb patients as per raised ESR levels

ESR	Frequency	Percent
Raised	54	72.0
Normal	21	28.0
Total	75	100.0

A significant majority, 54 individuals (72.0%), have raised ESR levels, while 21 individuals (28.0%) have normal ESR levels. This indicates that a majority of the sample has an inflammatory or infectious condition, as suggested by elevated ESR levels.

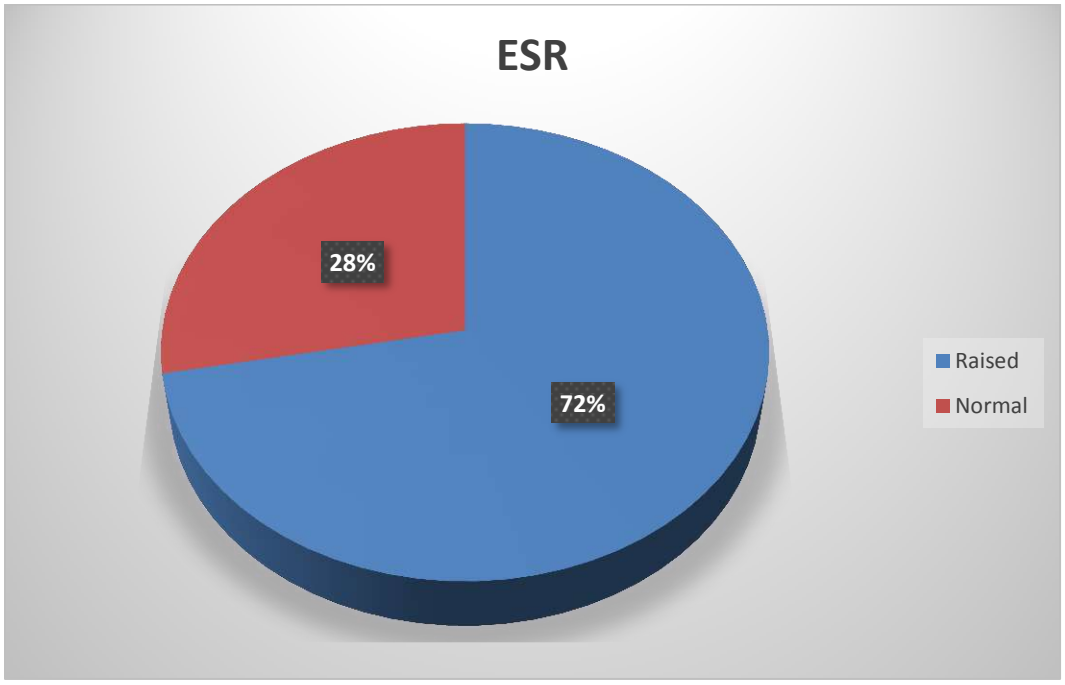

Figure 11: Distribution of Tb patients as per raised ESR levels

Table 10: Distribution of patients according to Z score (weight for age)

z score weight for age	Frequency	Percent
-3	16	21.3
-2	18	24.0
-1	19	25.3
0	14	18.7
1	5	6.7
2	3	4.0
Total	75	100.0

The scores range from -3 to 2, with the highest frequency in the -1 category (25.3%), followed by -2 (24.0%) and -3 (21.3%). Fewer individuals have scores of 0 (18.7%), 1 (6.7%), and 2 (4.0%). This distribution suggests a generally lower weight-for-age among the majority of individuals, indicating potential undernutrition.

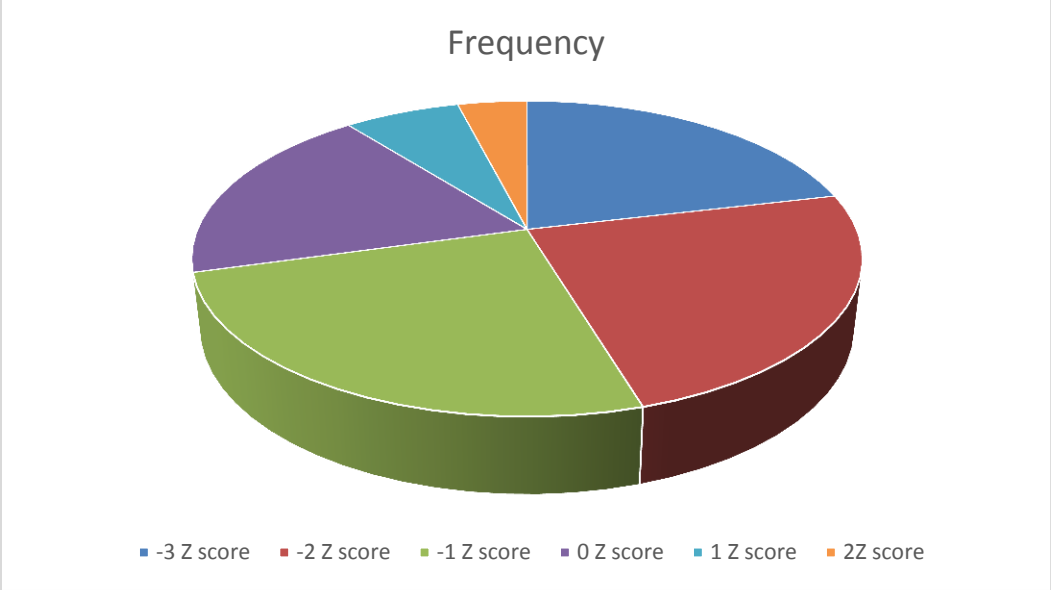

Figure 12: Distribution of patients according to Z score (weight for age)

Table 11: Distribution of patients according to Z score (weight for height)

z score weight for height	Frequency	Percent
-3	3	4.0
-2	17	22.7
-1	22	29.3
0	23	30.7
1	8	10.7
2	2	2.7
Total	75	100.0

Most individuals fall into the 0 (30.7%) and -1 (29.3%) categories, indicating a relatively normal or slightly below normal weight-for-height. Lower frequencies are seen in the -2 (22.7%) and 1 (10.7%) categories, with very few individuals in the -3 (4.0%) and 2 (2.7%) categories. This distribution suggests that while some individuals may be underweight, the overall weight-for-height status is closer to normal compared to the weight-for-age status.

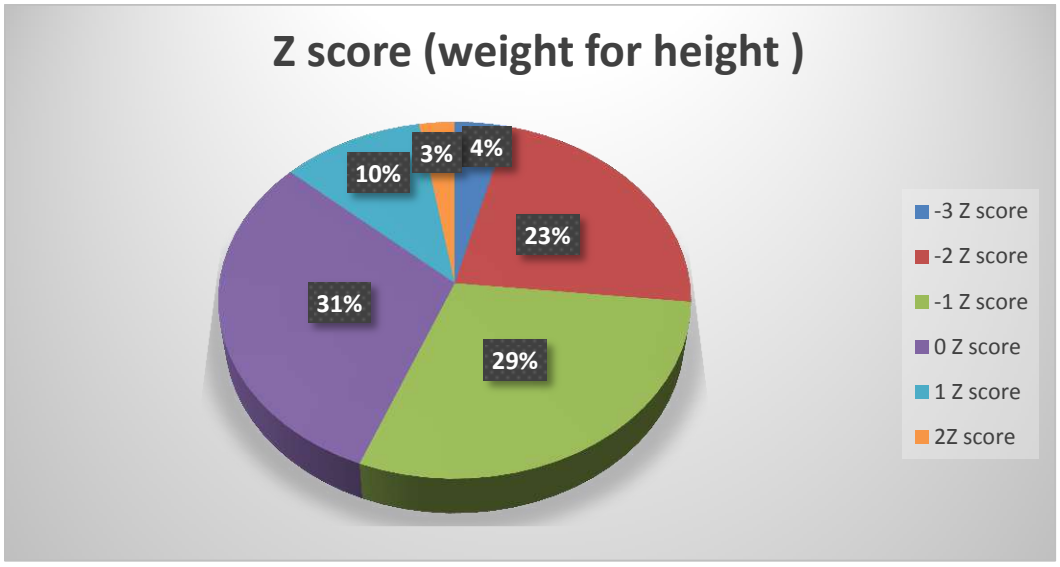

Figure 13: Distribution of patients according to Z score (weight for height)

Table 12: Distribution of patients according to type of TB

	Frequency	Percent
Pulmonary TB	24	32.0
Abdominal TB	23	30.7
CNS TB	22	29.3
Disseminated TB	4	5.3
Others	2	2.7

The data represents the distribution of tuberculosis (TB) cases across different types. Pulmonary TB is the most prevalent, accounting for 32.0% of the cases (24 instances), followed closely by Abdominal TB at 30.7% (23 instances) and CNS TB at 29.3% (22 instances).This distribution highlights the predominance of pulmonary involvement but also shows significant.

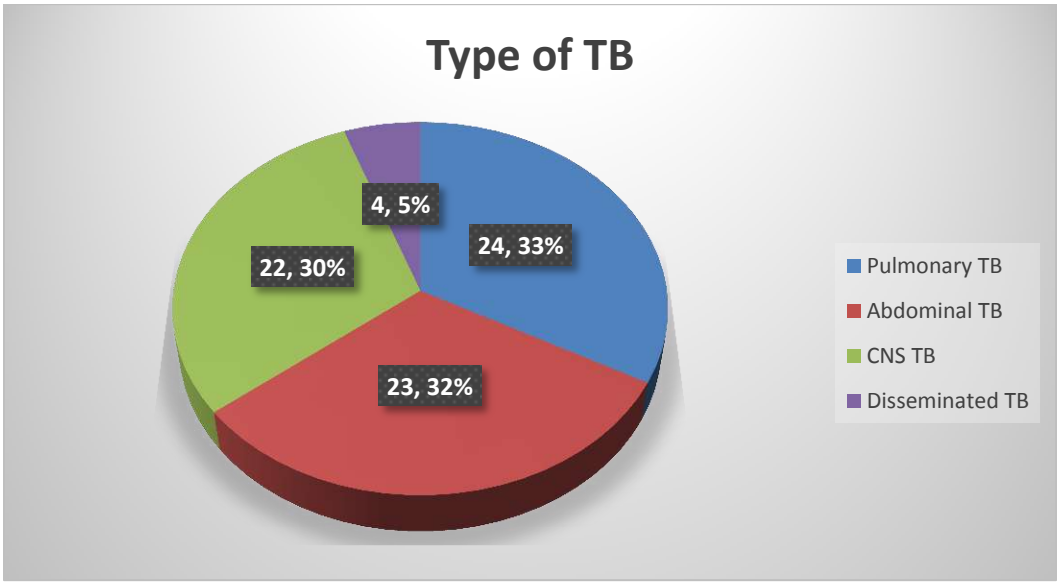

Figure 14: Distribution of patients according to type of TB

Table 13: Comparison of Mean age within type of TB

	N	Mean	Std. Deviation	f-value	p-value
Pulmonary TB	24	12.04	3.962	2.47	0.051
Abdominal TB	23	12.30	4.567		
CNS TB	22	9.55	5.050		
Disseminated TB	4	16.00	0.000		
Others	2	9.50	4.950		
Total	75	11.53	4.613		

The mean age for pulmonary TB was 12.04±3.96 while for abdominal tab it was 12.30 years. for CNS TB the mean age was 9.55±5.05 and for disseminated TB, it was 16±0. the mean age for tuberculoma and lymph node TB was 9.50±4.95 years. In both above tables, we observed that the mean age for pulmonary and abdominal TB had almost the same mean age while the mean age for CNS TB was less than the pulmonary and abdominal TB

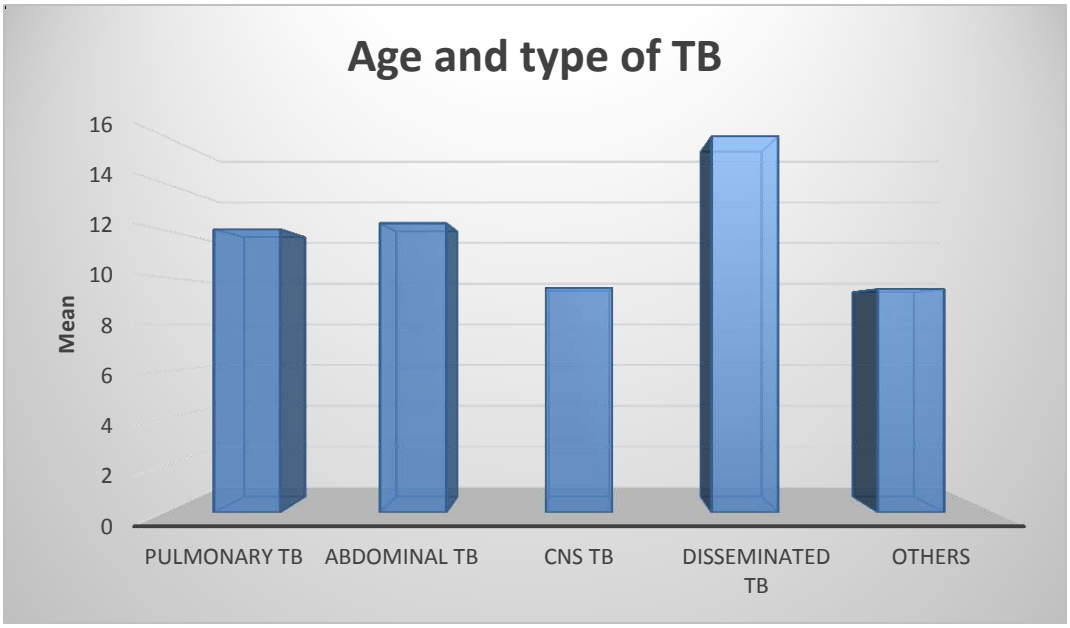

Figure 15: Distribution of sex according to type of TB

Table 14: distribution of gender within different types of Tb

	Type of TB						Chi-square	p-value
	Pulm-onary TB	Abdo-minal TB	CNS TB	Diss-eminated TB	others	Total		
	n%	n%	n%	n%	n%	n%		
Female	13 54.2%	6 26.1%	13 59.1%	3 75.0%	1 50%	36 48%	7.04	0.13
Male	11 45.8%	17 73.9%	9 40.9%	1 25.0%	1 50%	39 52%		
Total	24 100%	23 100%	22 100%	4 100.0%	2 100%	75 100%		

The study consisted of 36(48%) females and 39(52%) males. For pulmonary TB, 54.2% of the cases are female (13 out of 24), while 45.8% are male (11 out of 24). Abdominal TB shows a different pattern, with 73.9% of the cases being male (17 out of 23) and 26.1% female (6 out of 23). CNS TB is more prevalent in females, accounting for 59.1% of the cases (13 out of 22) compared to 40.9% in males (9 out of 22). Disseminated TB is predominantly found in females, who make up 75% of the cases (3 out of 4), with males representing 25% (1 out of 4). For the 'other' category, both genders are equally represented, each with 50% of the cases (1 each). Disseminated Tb was more in females while abdominal Tb was more in males and no significant difference was seen in sex and site of tb.

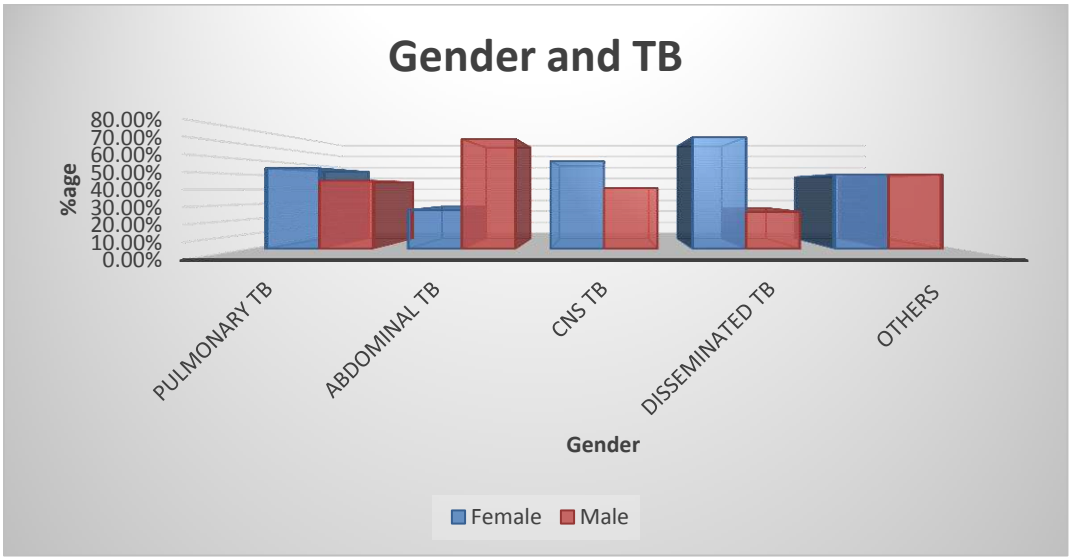

Figure 16: Distribution of gender according to type of TB

Table 15: Distribution of symptoms according to type of TB

	Type of TB						Chi-square	p-value
	Pulmonary TB	Abdominal TB	CNS TB	Disseminated TB	Others	Total		
	N %	N %	N %	N %	N %	N %		
Fever	24 100.0%	22 95.7%	18 81.8%	4 100.0%	1 50.0%	69 92.0%	10.74	0.03
Loss appetite	18 75.0%	20 87.0%	11 50.0%	4 100.0%	2 100.0%	55 73.3%	10.52	0.03
weight loss	14 58.3%	21 91.3%	8 36.4%	4 100.0%	2 100.0%	49 65.3%	18.70	0.00
Cough	18 75.0%	7 30.4%	3 13.6%	4 100.0%	1 50.0%	33 44.0%	24.43	0.00
Pain abdomen	3 12.5%	20 87.0%	2 9.1%	4 100.0%	0 0.0%	29 38.7%	45.26	0.00
vomiting	7 29.2%	10 43.5%	11 50.0%	0 0.0%	0 0.0%	28 37.3%	6.13	0.19
seizures	4 16.7%	4 17.4%	18 81.8%	0 0.0%	1 50.0%	27 36.0%	29.81	0.00
headache	5 20.8%	0 0.0%	18 81.8%	0 0.0%	1 50.0%	24 32.0%	39.47	0.00
loose stools	2 8.3%	1 4.3%	0 0.0%	0 0.0%	0 0.0%	3 4.0%	2.34	0.67
Back pain	1 4.2%	0 0.0%	0 0.0%	0 0.0%	1 50.0%	2 2.7%	18.81	0.00
swelling	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 50.0%	1 1.3%	36.99	0.00

Majority of patients with TB reported fever with 69(92%) patients followed by loss of appetite which was seen in 55(73.3%) patients, weight loss seen in 49(65.3%) patients cough was seen in 33(44%) patients, pain abdomen seen in 29(38.7%) patients, vomiting was seen in 28(37.3%), seizures in 27(36%) , headaches in 24(32%) wheezing in 7(9.3%), loose stools in 3(4%), back pain and swelling was observed in 2(2.7%) and 1(1.3%) patients respectively.

Patients with pulmonary tuberculosis (TB) and disseminated TB commonly present with fever (100%), loss of appetite (75% in pulmonary TB and 100% in disseminated TB), weight loss (58.3% in pulmonary TB and 100% in disseminated TB), cough (75% in pulmonary TB and 100% in disseminated TB), and abdominal pain (12.5% in pulmonary TB and 100% in disseminated TB). Vomiting is observed in 29.2% of pulmonary TB cases. Abdominal TB is characterized by fever (95.7%), loss of appetite (87%), weight loss (91.3%), cough (30.4%), abdominal pain (87%), vomiting (43.5%), and seizures (17.4%). Central nervous system (CNS) TB manifests with fever (81.8%), loss of appetite (50%), weight loss (36.4%), cough (13.6%), abdominal pain (9.1%), vomiting (50%), seizures (81.8%), and headache (81.8%). Other forms of TB, such as tuberculoma and lymph node TB, display fever (50%), headache (50%), seizures (50%), loose stools (4.3% in abdominal TB and 8.3% in pulmonary TB), back pain (4.2% in pulmonary TB), and swelling (1 case). These symptoms highlight the diverse clinical manifestations of different types of TB, emphasizing the importance of tailored diagnostic and management approaches.

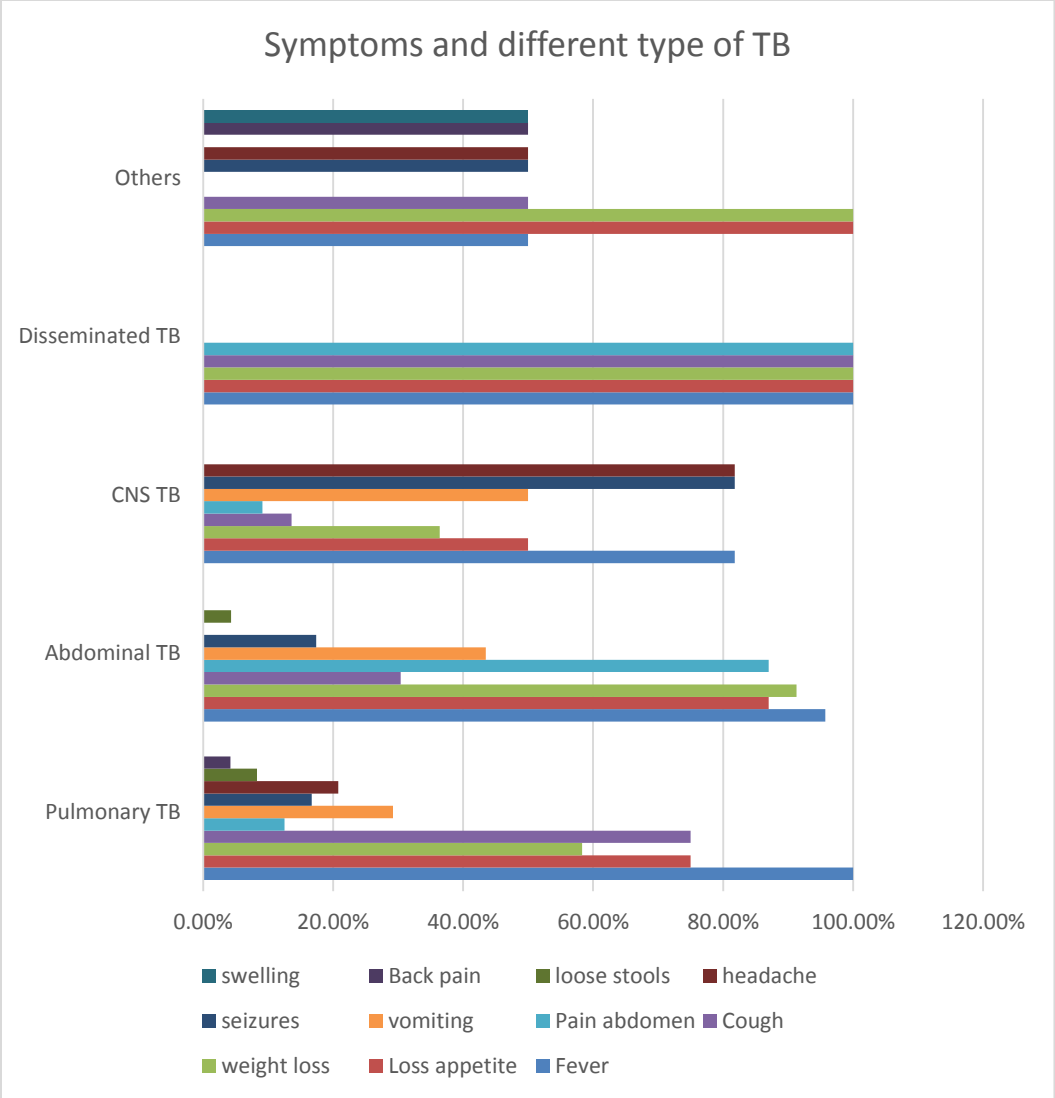

Figure 17: Distribution of symptoms according to type of TB

Table 16: Distribution of patients according to systemic involvement across different type of TB

Systemic examination	Type of TB						Chi-square	p-value
	pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total		
	N %	N %	N %	N %	N %	N %		
Renal symptoms	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%		
Cardiac symptoms	2 8.3%	1 4.3%	0 0.0%	4 100.0%	0 0.0%	7 9.3%	42.03	0.00
resp distress	16 66.7%	3 13.0%	0 0.0%	4 100.0%	0 0.0%	23 30.7%	37.64	0.00
muscular-skeletal symptom	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%	2.15	0.70
Haematological system	19 79.2%	22 95.7%	11 50.0%	4 100.0%	2 100.0%	58 77.3%	15.5	0.004

Overall, the above table provides insights into the specific systemic symptoms associated with each type of TB, highlighting differences in prevalence and clinical presentations across the different manifestations of the disease. The overall haematological system was affected the most with 58(77.3% cases) followed by respiratory distress which was seen in 23(30.7%) cases, cardiac system was involved in 7(9.3%) and the muscular skeleton system was involved in 1 (1.3%) cases.

1. Pulmonary TB

Hematological system symptoms: Present in 79.2% of patients, indicating a notable prevalence of hematological issues in pulmonary TB cases.

Cardiac symptoms: Observed in 8.3% of patients, suggesting a relatively lower occurrence compared to other types.

Respiratory distress: Reported in 66.7% of cases, indicating a high prevalence of respiratory issues among pulmonary TB patients.

- Muscular-skeletal symptoms: Present in only 4.2% of patients, indicating a relatively lower occurrence of such symptoms in pulmonary TB.

2. Abdominal TB:

- Hematological system symptoms: Seen in 95.7% of patients, suggesting a high prevalence of hematological issues in abdominal TB cases.
- Cardiac symptoms: Reported in 4.3% of patients, indicating a relatively lower occurrence compared to other types.
- Respiratory distress: Observed in 13.0% of cases, suggesting a lower prevalence compared to pulmonary TB.
- Muscular-skeletal symptoms: Not reported in this group.

3. CNS TB:

- Hematological system symptoms: Present in 50.0% of patients, indicating a moderate prevalence of haematological issues in CNS TB cases.
- Cardiac symptoms: Not reported in this group.

- Respiratory distress: Not reported in this group.
- Muscular-skeletal symptoms: Not reported in this group.

4. Disseminated TB:

- Hematological system symptoms: Present in 100% of patients, indicating a high prevalence of haematological issues in disseminated TB cases.
- Cardiac symptoms: Observed in 100% of patients, indicating a significant cardiac involvement in disseminated TB cases.
- Respiratory distress: Reported in 100% of cases, indicating a high prevalence compared to other types.
- Muscular-skeletal symptoms: Not reported in this group.

5. Others (Tuberculoma and Lymph Node TB):

- Hematological system symptoms: Present in 100% of patients, indicating a high prevalence of haematological issues in these cases.
- Cardiac symptoms: Not reported in this group.
- Respiratory distress: Not reported in this group.

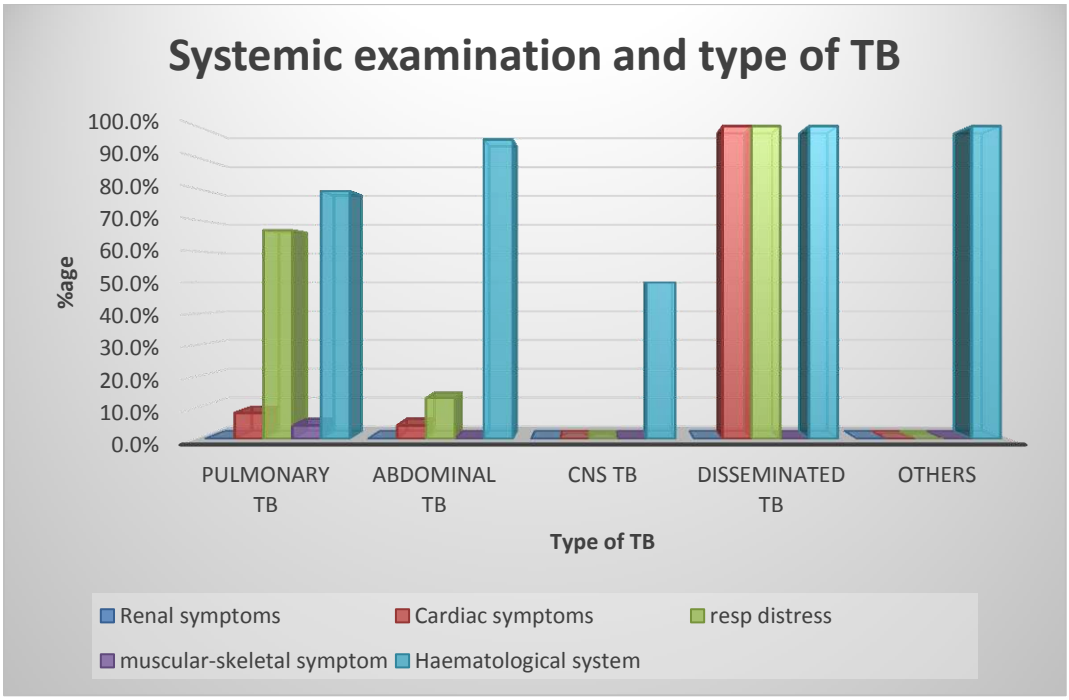

Figure 18: Distribution of patients according to systemic involvement

Table 17: Distribution of patients according to Signs across different type of TB

		Type of TB						Chi-square	p-value
		pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total		
		N %	N %	N %	N %	N %	N %		
general	Pallor	24 100.00%	23 100.00%	21 95.50%	4 100.00%	2 100.00%	74 98.70%	2.44	0.655
	Icterus	0 0.00%	6 26.10%	3 13.60%	0 0.00%	0 0.00%	9 12.00%	8.46	0.076
	Chest	21 87.50%	1 4.30%z	0 0.00%	4 100.00%	0 0.00%	26 34.70%	59.18	<0.001
	abdomen	1 4.20%	16 69.60%	1 4.50%	0 0.00%	0 0.00%	18 24.00%	37.81	<0.001
CVS	CVS/ soft heart sounds	1 4.20%	0 0.00%	0 0.00%	4 100.00%	0 0.00%	5 6.70%	59.59	<0.001
CNS	drowsy-post ictal	0 0.00%	0 0.00%	16 72.70%	4 100.00%	1 50.00%	21 28.00%	75.67	<0001
	GTCS	0 0.00%	0 0.00%	2 9.10%	0 0.00%	0 0.00%	2 2.70%		
	HYDROCEPHALUS	0 0.00%	0 0.00%	1 4.50%	0 0.00%	0 0.00%	1 1.30%		
	weakness	0 0.00%	0 0.00%	2 9.10%	0 0.00%	0 0.00%	2 2.70%		
lymphadenopathy	abdominal	0 0.0%	9 39.1%	0 0.0%	0 0.0%	0 0.0%	6 8.0%	35.24	0.01
	Hilar	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%		
	perihilar	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%		
	rt cervical	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%		

 General **Examination**:

- Pallor: Present in 98.70% of patients, indicating a high prevalence of anemia or other conditions causing paleness.
- Icterus (Jaundice): Present in 12.00% of patients, suggesting liver involvement or hemolysis in a subset of cases.

 Chest **Examination**:

- Chest findings: Present in 34.70% of patients, indicating respiratory system involvement, possibly related to pulmonary TB.

 Abdominal **Examination**:

- Abdominal findings: Present in 24.00% of patients, suggesting abdominal TB involvement or other abdominal pathologies.

 Cardiovascular **System (CVS) Examination**:

- Soft heart sounds: Observed in 6.70% of patients, indicating possible cardiovascular issues, though less prevalent in this cohort.

 Central **Nervous System (CNS) Examination**:

- Drowsy-post ictal: Present in 28.00% of patients, indicating altered consciousness levels after seizures, common in CNS TB cases.
- Generalized tonic-clonic seizures (GTCS): Observed in 2.70% of patients, suggesting neurological involvement and potential seizures.
- Hydrocephalus: Present in 1.30% of patients, indicating possible obstruction of cerebrospinal fluid flow, a complication of CNS TB.
- Weakness: Observed in 2.70% of patients, indicating neurological or muscular issues.

 Lymphadenopathy **Examination**:

- Abdominal lymphadenopathy: Present in 8.00% of patients, suggesting lymph node involvement in the abdomen, possibly due to TB.
- Hilar lymphadenopathy: Observed in 1.30% of patients, indicating lymph node enlargement in the chest region.

- Perihilar lymphadenopathy: Present in 1.30% of patients, indicating lymph node enlargement around the hilum of the lungs.
- Right cervical lymphadenopathy: Observed in 1.30% of patients, indicating lymph node enlargement on the right side of the neck.

With respect to different Type of TB the examination is illustrated below:

The examination findings for different types of tuberculosis (TB) reveal distinct patterns. In pulmonary TB cases, pallor is universally present (100.00%), indicative of prevalent anemia due to chronic inflammation. Chest findings are observed in the majority (87.50%), indicating respiratory system involvement typical of this type. Abdominal TB exhibits pallor in all cases (100.00%), often accompanied by jaundice (26.10%) and specific abdominal findings (69.60%), reflecting organ involvement. CNS TB commonly presents with pallor in the majority of cases (95.50%), alongside neurological symptoms like post-ictal drowsiness (72.70%), seizures (9.10%), hydrocephalus (4.50%), and weakness (9.10%), highlighting brain involvement. Disseminated TB showcases universal pallor (100.00%) and chest findings (100.00%), reflecting systemic spread and respiratory involvement. Other manifestations like tuberculoma and lymph node TB also show pallor (100.00%) and specific lymphadenopathy findings, underscoring the diverse presentations across TB types.

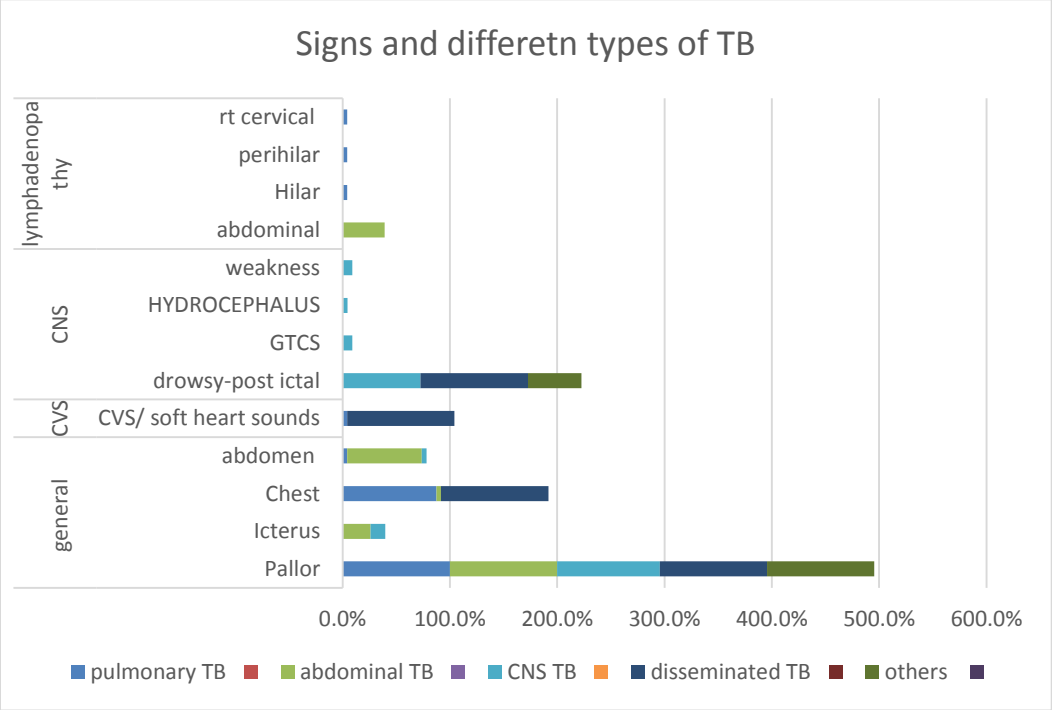

Figure 19: Distribution of patients according to Signs across different type of TB

Table 18: Distribution of patients according to Mantoux test positivity across various types of TB

	Type of TB						chi-square	p-value
	Pulmonary TB	Abdominal TB	CNS TB	Disseminated TB	Others	Total		
	N %	N %	N %	N %	N %	N %		
Negative	9 20.9%	1 2.3%	8 18.6%	21 48.8%	4 9.3%	43 100.0%	32.18	<0.001
11-15	6 75.0%	0 0.0%	1 12.5%	1 12.5%	0 0.0%	8 100.0%		
>15	9 37.5%	1 4.2%	14 58.3%	0 0.0%	0 0.0%	24 100.0%		
Total	24 32.0%	2 2.7%	23 30.7%	22 29.3%	4 5.3%	75 100.0%		

Among the negative Mantoux test results, disseminated TB cases were the most prevalent, constituting 48.8% (21 out of 43) of the negative results, followed by pulmonary TB at 20.9% (9 out of 43), CNS TB at 18.6% (8 out of 43), and a smaller proportion in the others category at 9.3% (4 out of 43). Only 2.3% (1 out of 43) of negative results were observed in abdominal TB cases. In the 11-15 mm Mantoux test result category, pulmonary TB was highly represented, accounting for 75% (6 out of 8) of the cases, while CNS TB and disseminated TB each accounted for 12.5% (1 out of 8), and no cases were found in abdominal TB or the others category. For Mantoux test results greater than 15 mm, CNS TB was the most common, making up 58.3% (14 out of 24) of the cases, followed by pulmonary TB at 37.5% (9 out of 24), and abdominal TB at 4.2% (1 out of 24), with no cases in disseminated TB or the others category. Overall, pulmonary TB represented 32.0% (24 out of 75) of the total cases, CNS TB accounted for 30.7% (23 out of 75), disseminated TB for 29.3% (22 out of 75), others for 5.3% (4 out of 75), and abdominal TB for 2.7% (2 out of 75). The chi-square test value of 32.18 and a p-value of less than 0.001 indicate a statistically significant association between Mantoux test results and the type of TB, suggesting that different TB types exhibit distinct Mantoux test result patterns.

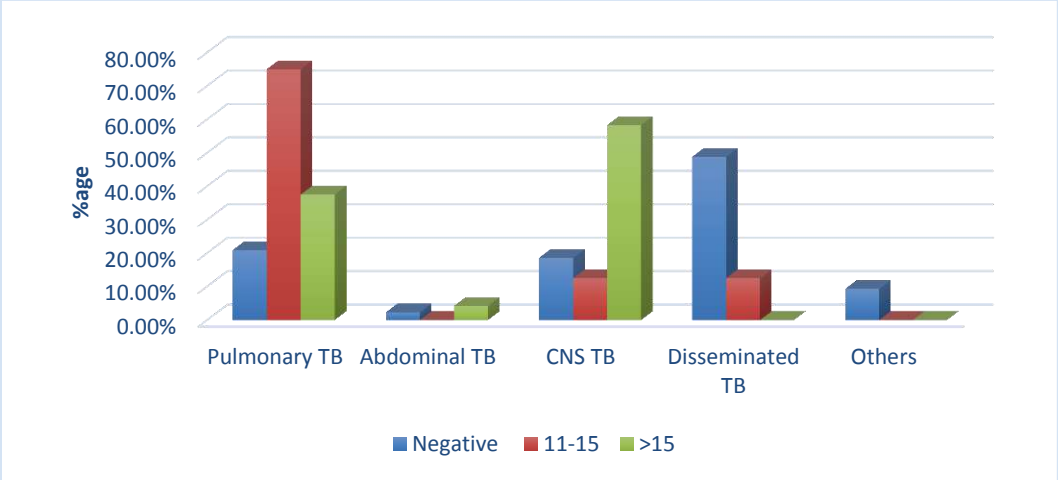

Figure 20: Distribution of patients according to Mantoux test positivity across various types of TB

Table 19: Distribution of patients according to Mantoux test positivity across various types of TB

IGRA	Type of TB						chi-square	p-value
	pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total		
	N %	N %	N %	N %	N %	N %		
Negative	16 30.8%	2 3.8%	15 28.8%	18 34.6%	1 1.9%	52 100.0%	6.45	0.167
Positive	8 34.8%	0 0.0%	8 34.8%	4 17.4%	3 13.0%	23 100.0%		
Total	24 32.0%	2 2.7%	23 30.7%	22 29.3%	4 5.3%	75 100.0%		

Among the positive IGRA test results, disseminated TB cases are the most common, accounting for 34.6% (18 out of 52) of the negative results, followed closely by pulmonary TB at 30.8% (16 out of 52) and CNS TB at 28.8% (15 out of 52). A small percentage of negative results are observed in abdominal TB (3.8%) and other types of TB (1.9%). For the positive IGRA test results, pulmonary TB and CNS TB are equally represented, each making up 34.8% (8 out of 23) of the positive results, followed by disseminated TB at 17.4% (4 out of 23) and other types of TB at 13.0% (3 out of 23). There are no negative IGRA test results for abdominal TB. The chi-square test value of 6.45 and a p-value of 0.167 indicate that there is no statistically significant association between IGRA test results and the type of TB, suggesting that the IGRA test result patterns do not significantly differ among different TB types.

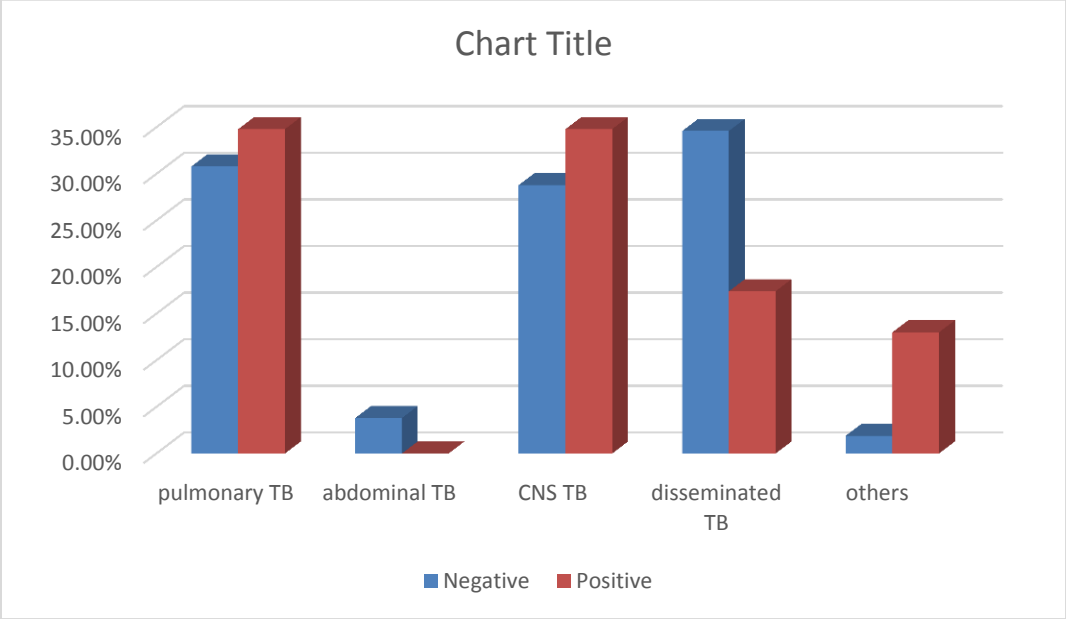

Figure 21: Distribution of patients according to Mantoux test positivity across various types of TB

Table 20: Correlation of IGRA with age

age groups	IGRA						chi-square	p-value
	Negative		Positive		Total			
	n	%	n	%	n	%		
0-5	9	17.3%	1	4.3%	10	13.3%	3.61	.18
6-10	11	21.2%	3	13.0%	14	18.7%		
11-18	32	61.5%	19	82.6%	51	68.0%		
	52	100.0%	23	100.0%	75	100.0%		

We observed that the positivity of the IGRA test increases as the age of the patient

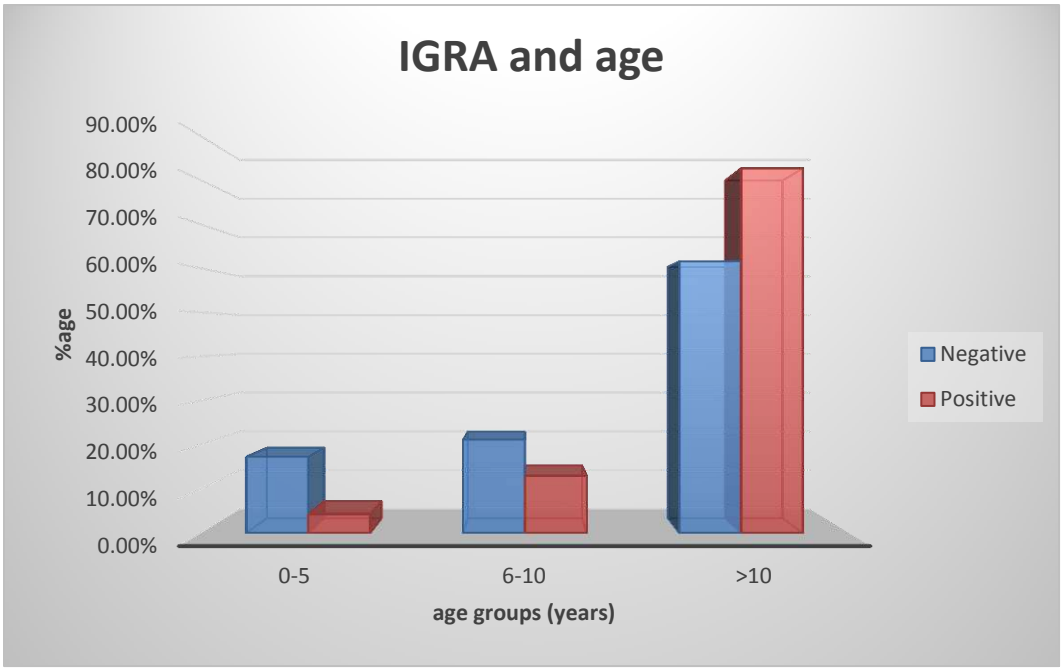

Figure 22: Distribution of patients according to IGRA across different age group

Table 21: Distribution of patients across different type of with respect to diagnosis by CBNAAT

		Type of TB					
		pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total
		N %	N %	N %	N %	N %	N %
GA CBNAAT	negative	18 75.0%	14 60.9%	22 100.0%	4 100.0%	2 100.0%	60 80.0%
	low positive	3 12.5%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	3 4.0%
	high positive	3 12.5%	9 39.1%	0 0.0%	0 0.0%	0 0.0%	12 16.0%
sputum CBNAAT	negative	21 87.5%	16 69.6%	21 95.5%	3 75.0%	1 50.0%	62 82.7%
	positive	2 8.3%	4 17.4%	0 0.0%	1 25.0%	0 0.0%	7 9.3%
	low positive	1 4.2%	3 13.0%	0 0.0%	0 0.0%	0 0.0%	4 5.3%
	medium positive	0 0.0%	0 0.0%	1 4.5%	0 0.0%	1 50.0%	2 2.7%

The table presents the CBNAAT (Cartridge-Based Nucleic Acid Amplification Test) results for gastric aspirate and sputum samples across various types of tuberculosis (TB).

For Gastric Aspirate (GA) CBNAAT, 75.0% of pulmonary TB cases, 60.9% of abdominal TB cases, and 100.0% of CNS, disseminated, and other TB cases tested negative, totaling 80.0% negative results. Positive results were categorized into low and high positives, with low positives found in 12.5% of pulmonary TB cases and high positives in 12.5% of pulmonary TB cases and 39.1% of abdominal TB cases, amounting to 4.0% low positive and 16.0% high positive overall.

For Sputum CBNAAT, 87.5% of pulmonary TB cases, 69.6% of abdominal TB cases, 95.5% of CNS TB cases, 75.0% of disseminated TB cases, and 50.0% of other TB cases tested negative, resulting in 82.7% negative results. Positive results were categorized into positive, low positive, and medium positive. Positive results were found in 8.3% of pulmonary TB cases, 17.4% of abdominal TB cases, and 25.0% of disseminated TB cases, totaling 9.3%. Low positives were seen in 4.2% of pulmonary TB cases and 13.0% of abdominal TB cases, amounting to 5.3% overall. Medium positives were identified in 4.5% of CNS TB cases and 50.0% of other TB cases, accounting for 2.7% overall.

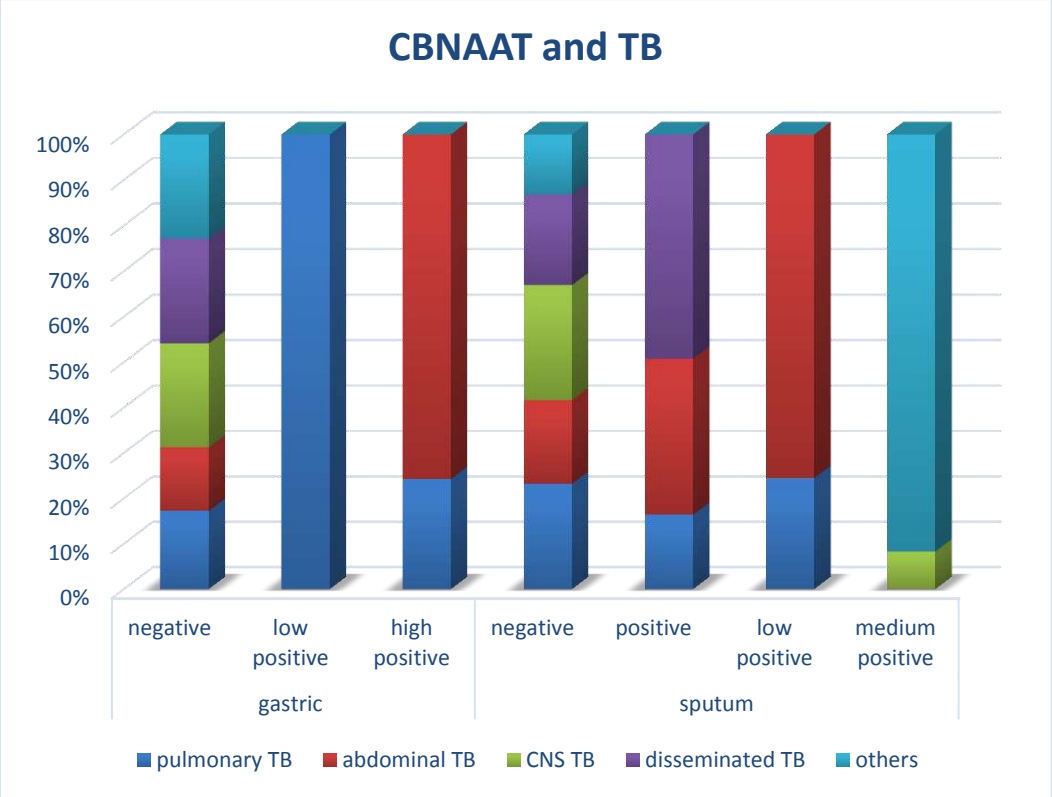

Figure 23: Distribution of patients across different type of with respect to diagnosis by CBNAAT

Table 22: Distribution of patients according to Xray findings across different types of TB

		Type of TB					
		Pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total
		N %	N %	N %	N %	N %	N %
CXR	no findings	7 29.2%	22 95.7%	21 95.5%	0 0.0%	1 50.0%	51 68.0%
	bilateral scattered opacities	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%
	miliary TB	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%
	Perihilar lymph nodes	8 33.3%	1 4.3%	0 0.0%	0 0.0%	0 0.0%	9 12.0%
	pleural effusion	7 29.2%	0 0.0%	0 0.0%	4 100.0%	0 0.0%	11 14.7%
	rt hilar lymphade0pathy	0 0.0%	0 0.0%	1 4.5%	0 0.0%	1 50.0%	2 2.7%
USG ABD	normal	1 4.2%	0 0.0%	1 4.5%	0 0.0%	0 0.0%	2 2.7%
	not done	23 95.8%	8 34.8%	21 95.5%	0 0.0%	1 50.0%	53 70.7%
	abdominal lymphadenopathy	0 0.0%	14 60.9%	0 0.0%	4 100.0%	0 0.0%	18 24.0%
	lymphatic	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 50.0%	1 1.3%
	terminal ileitis	0 0.0%	1 4.3%	0 0.0%	0 0.0%	0 0.0%	1 1.3%

The distribution of findings across different types of tuberculosis (TB) reveals varied manifestations on chest X-ray (CXR) and ultrasonography of the abdomen (USG ABD), underscoring the diverse nature of the disease. In pulmonary TB cases, CXR showed a range of presentations including no findings in 29.2% of cases, bilateral scattered opacities in 4.2%, miliary TB in 4.2%, perihilar lymph nodes in 33.3%, and pleural effusion in 29.2%. Abdominal TB predominantly exhibited no findings on CXR in 95.7% of cases. However, USG ABD revealed normal findings in 4.2%, while it was not conducted in 34.8% of cases. Notably, abdominal lymphadenopathy was evident in 60.9% of cases on USG ABD. CNS TB primarily presented with no findings on CXR in 95.5% of cases, with rt hilar lymphadenopathy noted in 4.5%. USG ABD was not performed in 95.5% of cases, but lymphatic findings were observed in 50.0%. Disseminated TB mainly displayed pleural effusion on CXR in all cases (100.0%). Among cases classified as "Others" (Tuberculoma and Lymph Node TB), CXR showed no findings in 50.0% and perihilar lymph nodes in 50.0%. USG ABD was not conducted in 50.0% of these cases.

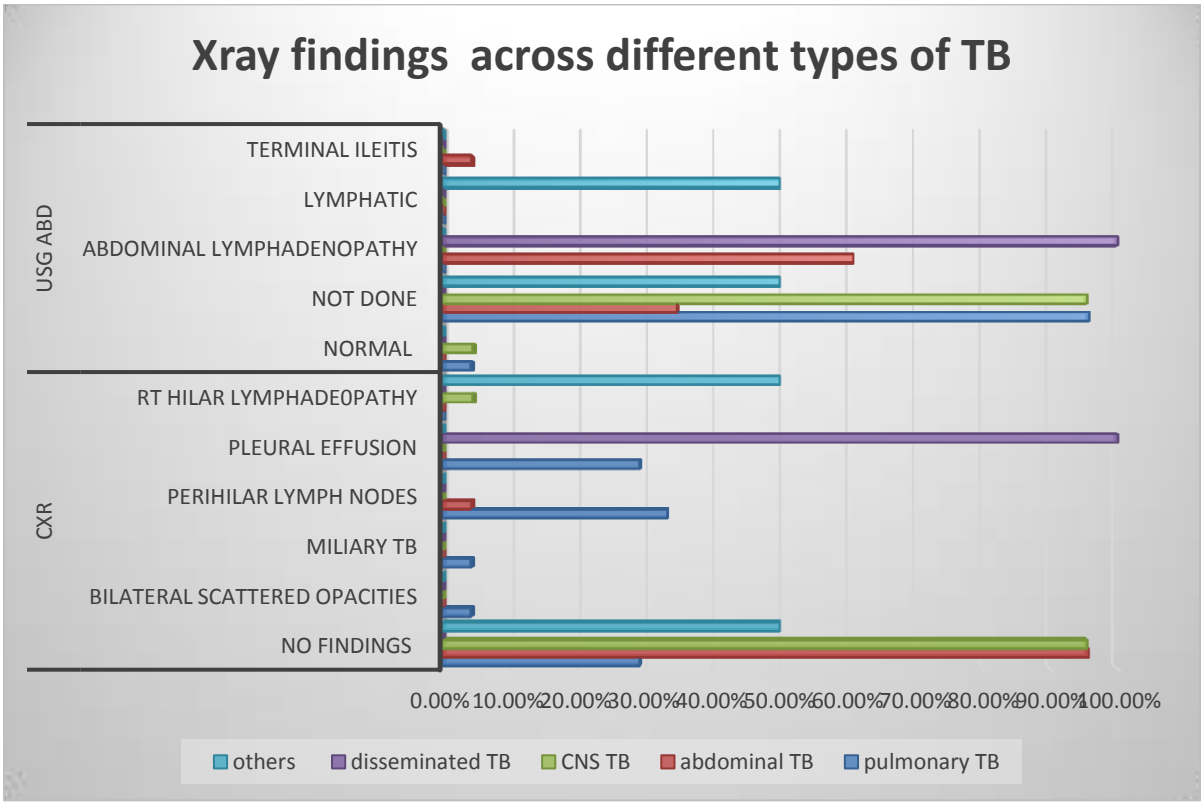

Figure 24: Distribution of patients according to Xray findings across different types of TB

Table 23: Distribution of patients according to CT- findings across different types of TB

		Type of TB					
		pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total
		n %	n %	n %	n %	n %	n %
CT abdomen	Abdominal Lymphadenopathy	0 0.0%	1 4.3%	0 0.0%	0 0.0%	0 0.0%	1 1.3%
	TERMINAL ILEITIS	0 0.0%	3 13.0%	0 0.0%	0 0.0%	0 0.0%	3 4.0%
CT chest	CT Chest bilateral miliary pattern of Tb	4 16.7%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4 5.3%
	consolidation	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%
	Necrotic Tb	1 4.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 1.3%
CT head	normal	0 0.0%	0 0.0%	0 0.0%	4 100.0%	0 0.0%	4 5.3%
	Communicating Hydrocephalus	0 0.0%	0 0.0%	1 4.5%	0 0.0%	0 0.0%	1 1.3%
MRI brain	Bilateral tiny nodules in cerebellar hemispheres	0 0.0%	0 0.0%	3 13.6%	0 0.0%	0 0.0%	3 4.0%
	Ring enhancing lesion	0 0.0%	0 0.0%	8 36.4%	0 0.0%	0 0.0%	8 10.7%
	TUBERCULAR MENINGITIS	0 0.0%	0 0.0%	6 27.3%	0 0.0%	0 0.0%	6 8.0%
	Multiple granulomatous lesions showing nodular and ring enhancement in bilateral cerebral and cerebellar hemispheres, pons and right basal ganglia	0 0.0%	0 0.0%	1 4.5%	0 0.0%	1 50.0%	2 2.7%
	not done	18 75.0%	19 82.6%	3 13.6%	0 0.0%	1 50.0%	41 54.7%

The diagnostic imaging findings across various types of tuberculosis (TB) provide insight into the diverse presentations of the disease:

CT Abdomen:

- Abdominal Lymphadenopathy was observed in 4.3% of abdominal TB cases and Terminal Ileitis in 13.0%.

CT Chest:

- In cases of pulmonary TB, CT Chest revealed a Bilateral Miliary Pattern of TB in 16.7% and consolidation in 4.2%. Necrotic TB was also noted in 4.2% of cases.

CT Head:

- Among CNS TB cases, CT Head showed Communicating Hydrocephalus in 4.5% and normal findings in 100.0%.

MRI Brain:

- MRI Brain findings in CNS TB cases included Bilateral Tiny Nodules in Cerebellar Hemispheres in 13.6%, Ring Enhancing Lesions in 36.4% and Tubercular Meningitis in 27.3%. Additionally, Multiple Granulomatous Lesions showing Nodular and Ring Enhancement in Bilateral Cerebral and Cerebellar Hemispheres, Pons, and Right Basal Ganglia were observed in 4.5% of cases.

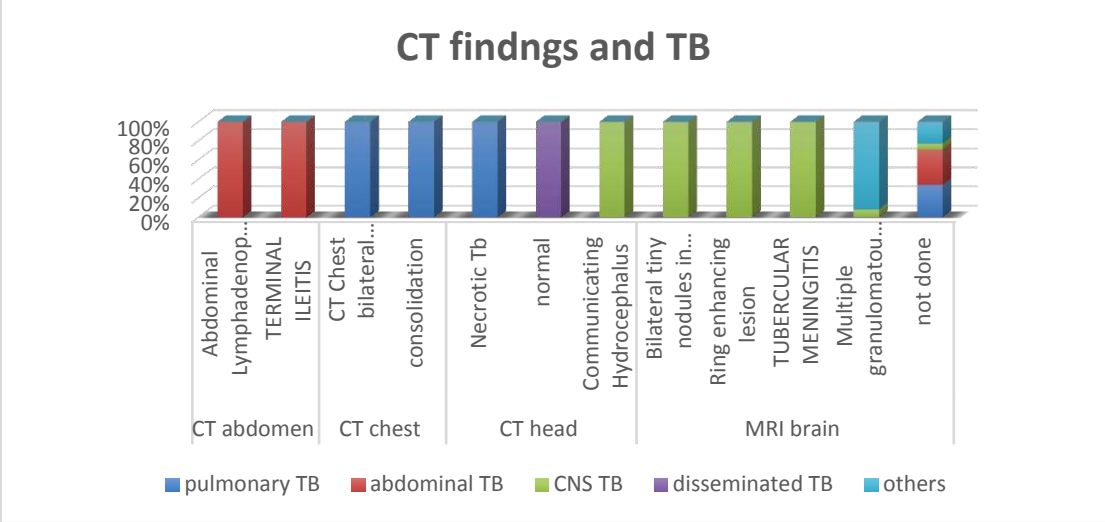

Figure 25: Distribution of patients according to CT- findings across different types of TB

Table 24: Distribution of patients according to Vaccination status SES findings across different types of TB

		Type of TB					
		pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total
		N %	N %	N %	N %	N %	N %
Vaccination status	not seen	18 75.0%	20 87.0%	17 77.3%	4 100.0%	2 100%	61 81.3%
	seen	6 25.0%	3 13.0%	5 22.7%	0 0.0%	0 0.0%	14 18.7%
Socio economic status	lower middle	14 58.3%	19 82.6%	11 50.0%	0 0.0%	2 100%	46 61.3%
	lower upper	1 4.2%	0 0.0%	1 4.5%	0 0.0%	0 0.0%	2 2.7%
	upper lower	5 20.8%	0 0.0%	7 31.8%	4 100.0%	0 0.0%	16 21.3%
	upper middle	4 16.7%	4 17.4%	3 13.6%	0 0.0%	0 0.0%	11 14.7%

The analysis of demographic and socioeconomic factors across all types of tuberculosis (TB) cases provides valuable insights into the characteristics of the affected population. The majority of TB cases (81.30%) had their vaccination status not documented, indicating a significant gap in available data regarding TB vaccination history. However, a smaller proportion (18.70%) had their vaccination status recorded, suggesting that some cases had documented information regarding TB vaccination.

Socioeconomic status varied among TB cases, with lower middle socioeconomic status prevailing in 61.30% of cases, indicating a substantial proportion of TB cases originating from this socioeconomic stratum. Lower upper, upper lower and upper middle socioeconomic statuses were also represented, albeit in smaller proportions of 2.70%, 21.30%, and 14.70% respectively.

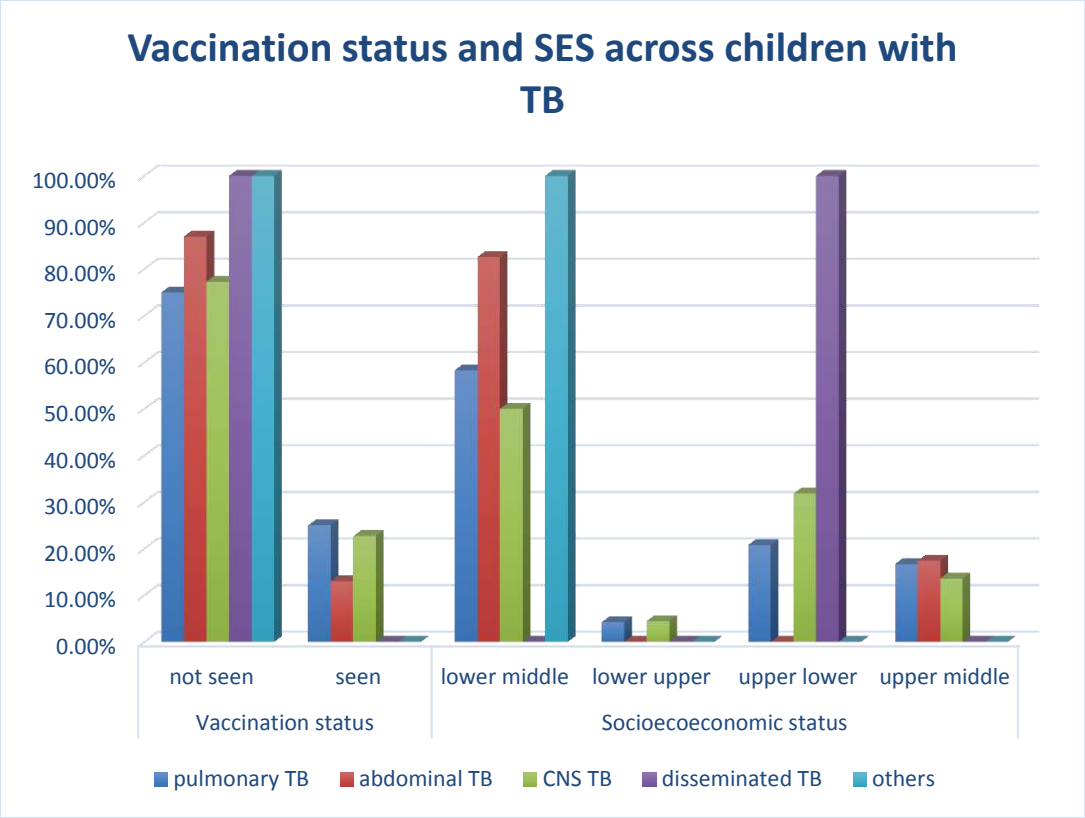

Figure 26: Distribution of patients according to Vaccination status SES findings across different types of TB

Table 25: Distribution of patients according to drug history across various types of TB

	Type of TB					
	pulmonary TB	abdominal TB	CNS TB	disseminated TB	others	Total
	N %	N %	N %	N %	N %	N %
Already on ATT	2 8.3%	7 30.4%	4 18.2%	0 0.0%	0 0.0%	13 17.3%
Steroids	2 8.3%	0 0.0%	18 81.8%	0 0.0%	1 50.0%	21 28.0%
Anticonvulsants	2 8.3%	0 0.0%	12 57.1%	0 0.0%	0 0.0%	14 18.9%
DILI	2 8.3%	8 34.8%	2 9.1%	4 100.0%	0 0.0%	16 21.3%

 Already **on ATT:** Among the TB cases, 17.3% (13 out of 75) were already on anti-tuberculosis treatment. This includes 8.3% (2 out of 24) of pulmonary TB cases, 30.4% (7 out of 23) of abdominal TB cases, 18.2% (4 out of 22) of CNS TB cases, and no cases in disseminated TB or other TB types.

 Steroids**:** 28.0% (21 out of 75) of the TB cases were on steroids. This includes 8.3% (2 out of 24) of pulmonary TB cases, 81.8% (18 out of 22) of CNS TB cases, and 50.0% (1 out of 2) of other TB types. Notably, no abdominal TB or disseminated TB cases were on steroids.

 Anticonvulsants**:** 18.9% (14 out of 75) of the TB cases were on anticonvulsants. This includes 8.3% (2 out of 24) of pulmonary TB cases and 57.1% (12 out of 22) of CNS TB cases. No cases in abdominal TB, disseminated TB, or other TB types were on anticonvulsants.

 Drug**-Induced Liver Injury (DILI):** 21.3% (16 out of 75) of the TB cases had drug-induced liver injury. This includes 8.3% (2 out of 24) of pulmonary TB cases, 34.8% (8 out of 23) of abdominal TB cases, 9.1% (2

out of 22) of CNS TB cases, and all disseminated TB cases (100%, 4 out of 4). There were no cases in the other TB types category with DILI.

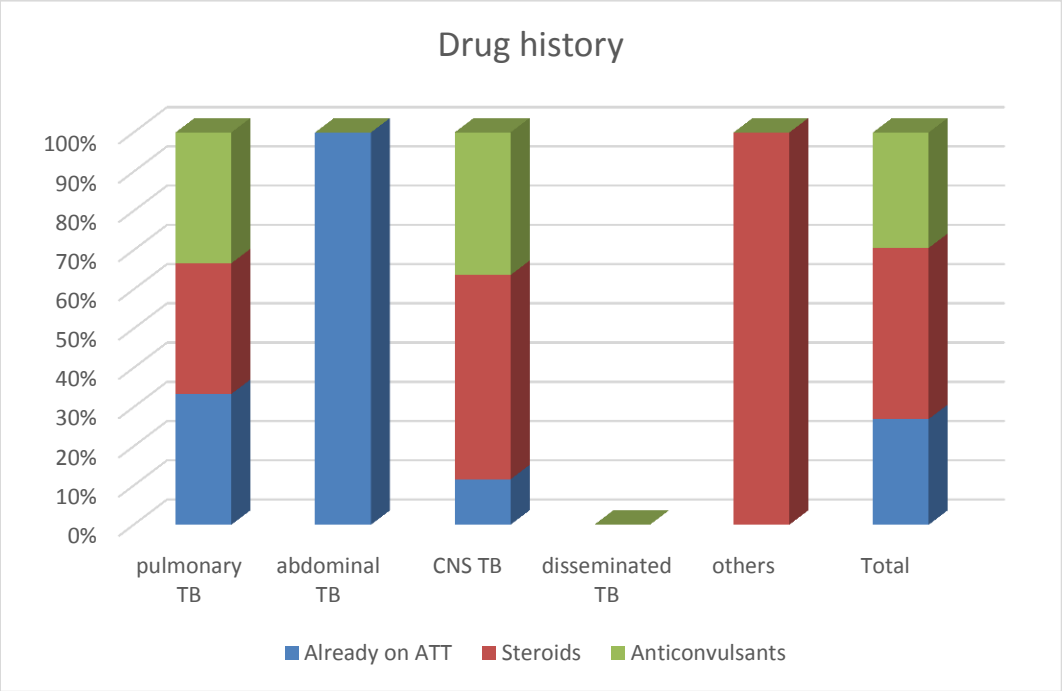

Figure 27: Distribution of patients according to drug history across various types of TB

Table 26: Weight gain across different type of TB

Weight gain	Type of TB						chi-square	p-value
	pulmonary TB	others	abdominal TB	CNS TB	Disse-minated TB			
Absent	9 30.0%	1 3.3%	8 26.7%	8 26.7%	4 13.3%	30 100%	6.52	0.167
Present	15 33.3%	1 2.2%	15 33.3%	14 31.1%	0 0.0%	45 100%		
Total	24 32.0%	2 2.7%	23 30.7%	22 29.3%	4 5.3%	75 100%		

For patients who did not experience weight gain, 30.0% had pulmonary TB, 3.3% had other types of TB, 26.7% had abdominal TB, 26.7% had CNS TB, and 13.3% had disseminated TB. This group consists of 30 patients in total. Among those who experienced weight gain, 33.3% had pulmonary TB, 2.2% had other types of TB, 33.3% had abdominal TB, 31.1% had CNS TB, and none had disseminated TB. This group consists of 45 patients.

Table 27: Weight gain seen at the last follow up

		Mean	N	Std. Deviation	t-value	p-value
Weight	At time of admission	30.92	75	11.7416	-9.1	<0.001
	weight at last follow up	34.76	75	12.1889		

Above table compares the mean weight of individuals at the time of admission and at the last follow-up. The mean weight at admission is

30.923 kg with a standard deviation of 11.7416, while the mean weight at the last follow-up is 34.767 kg with a standard deviation of 12.1889. The t-value of -9.1 and a p-value of less than 0.001 indicate a statistically significant increase in weight over the follow-up period.

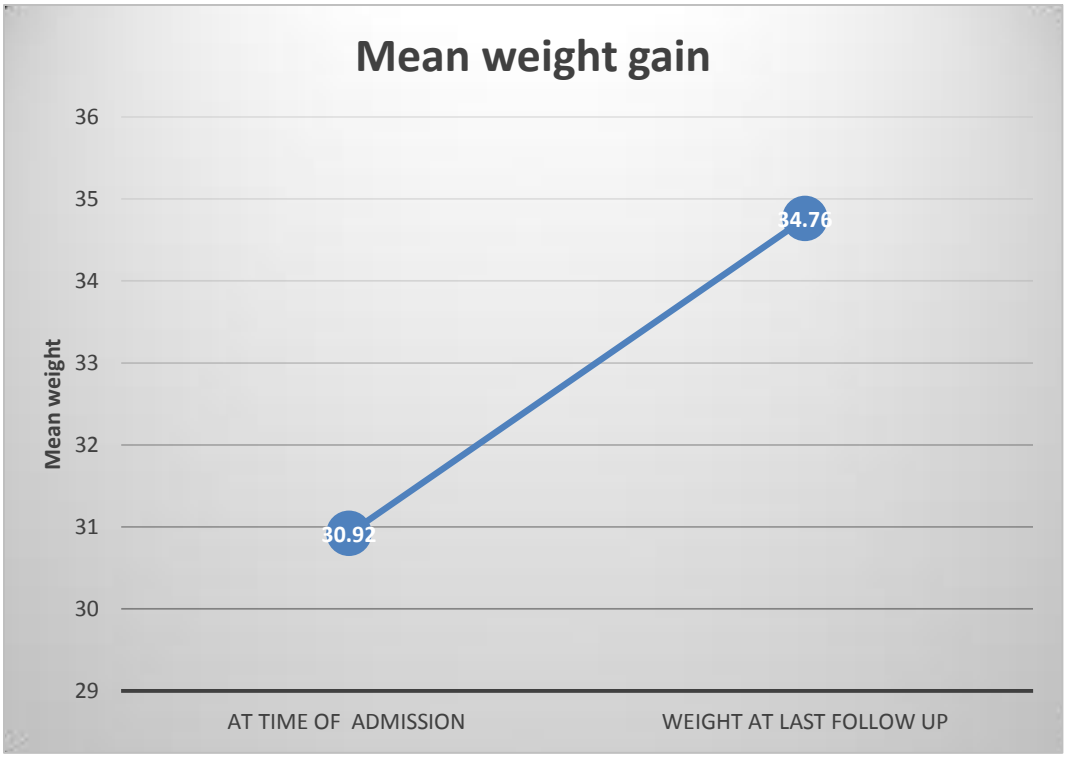

Figure 28: Weight gain seen at the last follow up

DISCUSSION

India contributes 1/5th of the total global burden of TB. Usually, malnourished children <5 years of age are found to be more frequently affected. The prospective observational study was conducted in the Department of Paediatrics, Dayanand Medical College and Hospital, Ludhiana. 75 children patients who have been diagnosed with Tuberculosis were included in the study. The results of the present study are discussed below:

The current study, conducted at the Department of Paediatrics, Dayanand Medical College and Hospital in Ludhiana, analyzed the age distribution of 75 children diagnosed with tuberculosis (TB). The findings revealed that the 11-15 years age group had the highest frequency, with 36 individuals, followed by the >15 years group with 15 individuals, the 6-10 years group with 14 individuals, and the ≤5 years group with 10 individuals. The mean age of the patients was 11.53±4.63 years.

The study by Bajaj et al.,[39] conducted on 128 patients in the sub-Himalayan region, provides additional insights. In their study, a significant majority (76.32%) of the children were in the age group of 11-18 years, followed by 9.21% in the age group of 6-10 years. The mean age of the study group was 10.3 ± 4.5 years. This aligns with the present study, which also found a higher prevalence in the older pediatric age group (11-15 years), supporting the notion that older children are more frequently diagnosed with TB in certain regions.

Ashna et al.'s study presented a slightly different age distribution. They reported that 23% of the children were in the 1-5 years group, 24.40% in the 5-8 years group, and 51.19% were more than 8 years old, with only 1.19% being less than 1 year old. The notable aspect of their findings is that about 51% of the affected patients were above the age of 8 years,

which aligns with the present study where the majority were in the 11-15 years range. [34]

Ksoo et al.'s[35] study in Northeast India found that the mean age at presentation was 9.3 ± 4.4 years. Their age distribution also showed a high prevalence in the under-five years group (n=46) and the 11-15 years group (n=45). This pattern is somewhat consistent with the current study, especially the significant number of cases in the 11-15 years group.

Rebecca et al.[40] studied the clinical profile of TB in 274 patients and reported a mean age at diagnosis of 9.1 years (SD±5.1 years). This mean age is lower than that observed in the current study (11.53±4.63 years), indicating that the TB cases in Rebecca et al.'s study were diagnosed earlier. The broader standard deviation in Rebecca et al.'s study also suggests a wider age range of affected individuals.

Shah et al.'s [33]study at DY Patil Hospital found the mean age of presentation to be 5.3 ± 3.5 years. This significantly lower mean age compared to the current study suggests that TB diagnosis occurred much earlier in their patient population. This discrepancy could be due to differences in regional healthcare practices, diagnostic capabilities, or epidemiological patterns.

The variations in age distribution and mean age at diagnosis across different studies highlight several critical factors influencing TB diagnosis in pediatric populations. The present study's findings of a higher prevalence in the 11-15 years age group may be attributed to delayed healthcare-seeking behavior and insufficient contact tracing among adults with TB, as suggested by Bajaj et al and Ashna et al. The differences observed in the studies by Ksoo et al., Rebecca et al., and Shah et al. further underscore the impact of regional health infrastructure, public awareness, and socio-economic factors on TB diagnosis.

Table 28: Variation in age distribution and mean age at diagnosis across different studies

study	Location	Sample Size	Most Common Age Group	Mean Age (years)	Notes
Present Study	Ludhiana, India	75	11-15 years (48%)	11.53 ± 4.63	Highest frequency in 11-15 years age group
Ashna et al. [34]	GMC, Jammu	418	>8 years (51.19%)	Not specified	51% of patients above 8 years
Bajaj et al. [39]	Sub-Himalayan region	128	11-18 years (76.32%)	10.3 ± 4.5	High prevalence in 11-18 years age group
Ksoo et al. [35]	Northeast India	150	≤5 years	9.3 ± 4.4	High prevalence in ≤5 and 11-15 years age groups
Rebecca et al. [40]	South india	274	Not specified	9.1 ± 5.1	Broader standard deviation indicating wide age range
Shah et al. [33]	DY Patil Hospital	135	Not specified	5.3 ± 3.5	Lower mean age compared to present study

In the present study conducted at Dayanand Medical College and Hospital, Ludhiana, the gender distribution among 75 children diagnosed with tuberculosis (TB) was nearly balanced, with 52% males and 48% females. This contrasts with the findings of Ashna et al., where a significantly higher proportion of males (66.5%) and a lower proportion of females (33.49%) were observed. Similarly, the study by Shah et al. also

reported a higher percentage of males (65.93%) compared to females (34.07%).

Conversely, the study by Kakroo et al. in Jammu and Kashmir found a higher percentage of females (52.2%) than males (47.79%), indicating regional differences in gender distribution among pediatric TB patients. Tripathi et al.'s study showed an even higher proportion of females (58.7%) compared to males (41.2%), further highlighting these differences. [41]

Ksoo et al.'s study reported that 53.33% of the TB cases were boys, closely aligning with the present study's findings (52% males). The variations in gender distribution across these studies suggest that regional, cultural, and methodological factors may influence the observed patterns of TB in pediatric populations. [35]

Table 29: Gender Distribution in Pediatric Tuberculosis Studies

Study	Location	Sample Size	Males (%)	Females (%)	Notes
Present Study	Ludhiana, India	75	52	48	Nearly balanced gender distribution
Ksoo et al. [35]	Northeast India	150	53.33	Not specified	Gender distribution similar to the present study (males)
Ashna et al. [34]	Not specified	418	66.5	33.49	Significantly higher proportion of males
Kakroo et al. [41]	Jammu and Kashmir	136	47.79	52.2	Higher proportion of females
Shah et al. [33]	Not specified	135	65.93	34.07	Higher proportion of males
Tripathi et al. (2023) [36]	Not specified	81	41.2	58.7	Higher proportion of females

Clinical symptoms

In the present study, the majority of pediatric tuberculosis (TB) patients reported fever (92%), followed by loss of appetite (73.3%) and weight loss (65.3%). Cough was observed in 44% of patients, and abdominal pain in 38.7%. Other notable symptoms included vomiting (37.3%), seizures (36%), headaches (32%), wheezing (9.3%), loose stools (4%), back pain (2.7%), and swelling (1.3%).

Comparatively, in the study by Shah et al., fever was reported in 83% of patients, which is slightly lower than in the present study. Cough and loss of appetite were observed in 46.7% and 37.8% of patients, respectively. Other symptoms included chest pain (8.2%), respiratory distress (2.2%), hemoptysis (0.7%), abdominal pain (6.7%), and vomiting (5.9%), among others.

The study by Ksoo et al. also highlighted fever as the most common symptom (70.7%), followed by cough (43.3%), aligning with typical respiratory TB presentations. [35]

Aashna et al.'s study emphasized fever, weight loss, and anorexia as the main presenting symptoms, consistent with the present study's findings of these symptoms being prominent. [34]

In the study by Bajaj et al. conducted in the sub-Himalayan region, fever was reported in 71.05% of patients, dry cough in 61.84%, weight loss in 39.47%, and loss of appetite in 30.26%. Other symptoms included headache (13.15%), abdominal pain (11.84%), vomiting (11.84%), seizures (6.41%), dyspnea (5.26%), and neurological deficits (3.84%).[34]

Table 30: Clinical Symptoms in Pediatric Tuberculosis Studies

Study	Location	Sample Size	Fever (%)	Cough (%)	Loss of Appetite (%)	Weight Loss (%)
Present Study	Ludhiana, India	75	92	44	73.3	65.3
Shah et al. [33]	Not specified	135	83	46.7	37.8	Not specified
Ksoo et al. [35]	Northeast India	150	70.7	43.3	Not specified	Not specified
Bajaj et al. [39]	Sub-Himalayan region	128	71.05	61.84	30.26	39.47

This table and discussion provide a comprehensive comparison of clinical symptoms in pediatric TB patients across various studies, highlighting the similarities and differences in symptom presentation influenced by regional and methodological factors.

Types of TB

In present study pulmonary TB wass the most prevalent, accounting for 32.0% of the cases (24 instances), followed closely by Abdominal TB at 30.7% (23 cases) and CNS TB at 29.3% (22 cases). Less common types include Disseminated TB, which accounts for 5.3% (4 cases), and other forms of TB at 2.7% (2 cases). This distribution highlights the predominance of pulmonary involvement but also shows significant. Followed by abdominal and CNS TB with almost same percentage.

Neurological TB

The present study reports that 29.3% of pediatric TB cases are neurological. This percentage is lower than that found in the study by

Ashna et al. (42.8%) and Vijayasekaran et al. (40.4%), but higher than Kabra et al. (2.6%) and Vishwanath et al. (13.39%). These differences may result from variations in diagnostic criteria, population demographics, or healthcare access. The high prevalence in Ashna et al. and Vijayasekaran et al. could be due to a greater focus on neurological symptoms in those regions or better diagnostic facilities for detecting neurological TB.

Pulmonary TB

In the present study, pulmonary TB is the most common type, accounting for 32.0% of cases. This finding aligns with several other studies, although the prevalence varies. Ashna et al. report a higher prevalence at 45.45%, and Kabra et al. report an even higher rate at 59%. On the other hand, Sharda and Nelliyanil report a significantly lower prevalence at 10%.

Abdominal TB

The present study shows a high prevalence of abdominal TB at 30.7%, significantly higher than that reported in other studies. For instance, Ashna et al. report a prevalence of 6.45%, and Vishwanath et al. report only 2.67%. This disparity might be due to regional differences in TB manifestation, healthcare practices, or a greater diagnostic focus on abdominal TB in the present study's setting.

Lymphadenitis

Lymphadenitis is observed in 5.3% of cases in the present study, which is lower than several other studies. Ashna et al. report a prevalence of 2.63%, while Sharda and Nelliyanil report a much higher rate of 55%. Vijayasekaran et al. report 19.3%, and Kabra et al. report 26.5%. The moderate prevalence in the present study suggests a need for consistent diagnostic criteria and increased awareness.

Disseminated TB

The prevalence of disseminated TB in the present study is 2.7%, which is relatively low but consistent with several other studies. Ashna et al. report a lower prevalence of 0.47%, while Thanvi RS et al. report a higher rate of 12.91%. Vishwanath et al. report a prevalence of 2.67%, and Kabra et al. report 5%. These variations may reflect regional differences in the incidence and reporting of disseminated TB, as well as differences in diagnostic capabilities and healthcare infrastructure.

Table 31: Spectrum of TB Observed in Our Study Compared to Other Studies

Type of TB	Present Study (%)	Ashna et al. (%)[34]	Thanvi RS et al. (%)[42]	Vishwanath et al. (%)[43]	Vijayasekaran et al. (%)[44]	Kabra et al. (%)[45]	Sharda and Nelliyanil (%)[46]
Neurological	29.3	42.8	37.32	13.39	40.4	2.6	23.2
Pulmonary	32.0	45.45	32.05	49.10	20	59	10
Abdominal	30.7	6.45	12.91	2.67	3.6	2.1	6.5
Miliary	0.0	1.43	0.9	0.9	-	1.7	-
Osteoarticular	0.0	0.71	3.57	3.57	16.4	2.6	2.1
Lymphadenitis	5.3	2.63	0.95	15.17	19.3	26.5	55
Disseminated	2.7	0.47	12.91	2.67	-	5	2.2

In the present study, patients with various types of tuberculosis (TB) exhibit a range of clinical features, including universal pallor in pulmonary, abdominal, CNS, disseminated, and other forms of TB. Pulmonary TB is characterized by chest findings in the majority of cases (87.5%), while abdominal TB often presents with jaundice (26.1%) and specific abdominal findings (69.6%). CNS TB frequently shows neurological symptoms like post-ictal drowsiness (72.7%), seizures (9.1%), hydrocephalus (4.5%), and weakness (9.1%). Disseminated TB consistently displays chest findings (100%), indicating systemic spread

and respiratory involvement. Other TB types, such as tuberculoma and lymph node TB, also show pallor and specific lymphadenopathy findings.

Present study (2023): The weight percentile distribution among 75 tuberculosis (TB) patients. Nearly half (48.0%) had a weight percentile of less than 3. Another 46.7% had a weight gain percentile between 3 and 90, while only 5.3% had a weight gain percentile above 90.

Table 32: Percentage of malnutrition among TB patients in different studies

Study	Country	Specific TB Population	Number of Patients	Number (%) Malnourished*	Measurement of Malnutrition
Present Study (2023)	-	75 TB patients	75	-	Weight percentile distribution: <3 (48.0%), 3-90 (46.7%), >90 (5.3%)
Aygun et al (2019) [47]	Turkey	Patients <18 at TB clinic	163	80 (49.1)	Weight for age <3rd percentile
Blount et al (2014) [48]	Vietnam	Patients <16 at national referral hospital	103	16 (15.5)	WAZ < −3
Drobac et al (2012) [49]	Peru	Patients <15 at referral hospital	2392	890 (37.2)	Weight for age <3rd percentile
Hicks et al (2014) [50]	South Africa	Patients <15 at referral hospital with drug-resistant TB	84	42 (50.0)	Weight for age <3rd percentile
Laghari (2018) [51]	Pakistan	Patients <15 in DOTS registry	2167	1629 (75.2)	Weight for age <5th percentile

Malnutrition and tuberculosis are both problems of considerable magnitude in most of the underdeveloped regions of the world. It is important to consider, how these two problems tend to interact with each other. The term consumption has been virtually synonymous with tuberculosis throughout the history [52] and the link between tuberculosis

and malnutrition has long been recognized; malnutrition may predispose people to the development of clinical disease and tuberculosis can contribute to malnutrition. [53] Before the advent of antituberculosis chemotherapy, a diet rich in calories, proteins, fats, minerals, and vitamins was generally considered to be an important, if not essential factor in treatment of tuberculosis

We observed that that there was significant gain in weight after start of ATT. The mean weight of individuals at the time of admission and at the last follow-up. The mean weight at admission is 30.923 kg with a standard deviation of 11.7416, while the mean weight at the last follow-up is 34.767 kg with a standard deviation of 12.1889. The t-value of -9.1 and a p-value of less than 0.001 indicate a statistically significant increase in weight over the follow-up period.

XRAY

In present study Most cases, 68.00%, showed "No findings," suggesting no detectable abnormalities. However, specific findings included "Perihilar lymph nodes" in 12.00% of cases, indicating enlarged lymph nodes around the central area of the lungs. "Pleural effusion" was present in 14.70% of cases, indicating fluid accumulation around the lungs. Other less common findings included "Rt hilar lymphadenopathy," "Bilateral scattered opacities," and "Miliary TB," each occurring in smaller percentages of cases.

Tripathi et al[36] in 2023 conducted a study on 80 patients and found 37 cases (46.2%) exhibited normal chest X-rays, indicating that almost half of the TB cases did not show radiological abnormalities, which could suggest early or less severe disease. Hilar lymphadenopathy was observed in 14 cases (17.5%), reflecting the presence of enlarged lymph nodes, a common sign of TB. Bilateral consolidation, indicating widespread inflammation or infection in both lungs, was seen in 17 cases (21.25%). Miliary TB, characterized by numerous small nodules throughout the

lungs, was present in 3 cases (3.8%). Pleural effusion, the accumulation of fluid in the pleural cavity, was noted in 6 cases (7.5%). Lastly, pneumothorax, a condition where air accumulates in the pleural space causing lung collapse, was found in 3 cases (3.8%).

Mantoux test

Out of 75 patients, 43 (57.3%) tested negative for the Mantoux test, indicating no significant induration in response to the tuberculin injection. Eight patients (10.7%) showed an induration size of 11-15 mm, suggesting a moderate immune response to the TB antigen. The highest proportion, 24 patients (32.0%), exhibited an induration size greater than 15 mm, indicating a strong positive reaction to the tuberculin, typically associated with active TB infection or previous exposure.

In a study conducted by shah et al[33] out of 33 patients, 24 (72.7%) had a positive TST result with a mean induration of 17.8 ± 5.2 mm.

The tuberculin test has been the traditional method for detection of infection with tubercular bacilli. This test aids in the diagnosis of TB among children and to guide clinicians regarding the administration of chemoprophylaxis, which requires further confirmation with a more specific test such as Interferon-γ release assays (IGRAs). The diagnostic test for TB is the isolation of AFB from body fluids. Although reported AFB positivity is high in research studies, in routine practice the yield rate of isolation of AFB from body fluids in children is very poor. Therefore, the Mantoux test is crucial as a supportive test for diagnosis of TB in children.[54,55]

In present study among 75 patients, 52 (69.3%) tested negative while rest tested positive for IGRA, indicating the presence of an immune response to TB antigens.

Interferon gamma release assay (IGRA) blood tests and tuberculin skin tests (TST) assess the adaptive immune response to tuberculosis (TB) antigens to test for TB infection. Advantages of IGRAs include reduced inter-operator variability, lack of cross-reactivity with bacille Calmette-Guérin (BCG) vaccine antigens, and no need for a repeat visit to read a TST. These advantages have led some experts to call for “retirement” of the TST when IGRAs are available. [56] Disadvantages of IGRAs include need for phlebotomy, laboratory infrastructure, and cost.

In a study conducted by shaikh et al our study demonstrates that the TST and IGRAs performed poorly in diagnosing active TB in young children. While IGRA had better sensitivity than the TST in detecting culture-confirmed or clinically diagnosed TB. IGRAs are thought to be relatively unaffected by factors such as BCG vaccination, malnutrition and exposure to NTM, which compromise the diagnostic performance of TST, and they have been studied as an alternative to TST for diagnosing TB in children.[57-62]

In our study, we observed that IGRA (Interferon-Gamma Release Assay) exhibited a higher rate of negative results among individuals in younger age groups. Conversely, as age increased, there was a notable rise in the rate of positive IGRA results. Interestingly, individuals who had received vaccinations showed a potential for false positives when tested using the Mantoux test, which contrasts with IGRA results. One significant advantage of IGRA highlighted in our findings is its independence from vaccination status, making it a valuable tool in distinguishing true TB infections from false positives. This attribute underscores IGRA's utility in clinical settings for accurately diagnosing tuberculosis, particularly when vaccination history might otherwise complicate diagnostic interpretations.

CBNAAT

In present study for Gastric Aspirate (GA) CBNAAT, 60 patients (80.0%) tested negative, while 15 patients (20.0%) tested positive (including both low positive and high positive results). For Sputum CBNAAT, 62 patients

(82.7%) tested negative, whereas 13 patients (17.3%) tested positive (comprising positive, low positive, and medium positive results).

Sharma S et al. [63] in their study found that GA samples provide better diagnostic yield for the detection of paediatric pulmonary TB than IS samples. The findings show that diagnostic yield for different diagnostic modalities varies in different studies. Within the same study, microscopy was related to lower positivity rates while culture was associated with a higher positivity rate. This could be due to the fact that paediatric TB cases are paucibacillary in nature and culture helps to enhance the bacillary count substantially making it easier to detect.

The study by Mishra et al showed that the specimens included 70 GAs and 70 IS samples. The total number of specimens were 140 and we collected GA as well as IS from each of the patient enrolled in the study. When compared to microscopy, GeneXpert provides a quicker and earlier detection of paediatric TB. The sensitivity of the cartridge-based nucleic acid amplification test (CBNAAT) against mycobacterial growth indicator tube (MGIT) was 75.0% for GA samples and 63.64% for IS samples. [64]

Findings for Pulmonary TB

In the study, pulmonary TB patients had a mean age of 12.04 years with a standard deviation of 3.96. The gender distribution showed that 54.2% of the pulmonary TB cases were female. Common symptoms among pulmonary TB patients included fever (100%), loss of appetite (75%), weight loss (58.3%), cough (75%), and abdominal pain (12.5%). Notably, 66.7% of pulmonary TB patients experienced respiratory distress, and 79.2% had hematological system involvement. On examination, pallor was present in all pulmonary TB cases (100%), and chest findings were observed in 87.5% of the cases. The Mantoux test results indicated that 37.5% of pulmonary TB patients had a reaction greater than 15 mm, while 20.9% had negative results. The Interferon-Gamma Release Assay (IGRA) was positive in 34.8% in pulmonary TB.

Shah et al[33] in their study found that Pulmonary TB predominantly affects children aged 5 years or younger (55.1%) and has a higher proportion of males (59.2%). Symptoms include a very high prevalence of fever (91.8%) and loss of appetite (30.6%). Malnutrition is found in 34.9% of cases, anemia in 32.7%, and an increased platelet count in 30.3%. Raised ESR is seen in 75.9% of cases, and lymphocytosis in 21.5%. A high percentage of patients have received BCG vaccination (85.7%), and drug-resistant TB is present in 4.1% of cases. A study by Ashna et al [34] found Pulmonary tuberculosis cases had the chief complaints of fever, cough, malaise, weight loss and chest pain.

Ksoo et al[35] in their study reported that pulmonary TB predominantly affects older children and adolescents, with a mean age of 9.8 years in a subset of 25 patients and 10.2 years across all 60 cases. The median age for both groups is 10 years. A higher proportion of cases are female, with a male-to-female ratio of 7:18 in the subset and 15:21 in the total cases.
Common symptoms include fever (80% in the subset, 77% overall) and cough (76% in the subset, 63.9% overall). Other symptoms such as abdominal pain, weight loss, breathing difficulty, and hemoptysis are also observed but less frequently. A history of contact with TB is reported in 28% of the subset and 32.7% of the total cases.
Diagnostic findings show that chest X-rays are suggestive of TB in 64% of the subset and 62.3% overall. Sputum or gastric lavage tests are positive for acid-fast bacilli (AFB) in 56% of the subset and 47.5% of the total cases, while tissue or fluid AFB positivity is less common. The mortality rate is relatively low, at 8% in the subset and 6.6% overall.

Findings for Abdominal TB

In present study patients with abdominal TB had a mean age of 12.30 years with a standard deviation of 4.57. In terms of gender distribution, 73.9% of abdominal TB cases were male. Symptomatically, abdominal TB patients frequently reported fever (95.7%), loss of appetite (87%), weight

loss (91.3%), cough (30.4%), and abdominal pain (87%). Hematological system symptoms were prevalent in 95.7% of abdominal TB cases, and 13% experienced respiratory distress. On examination, pallor was universally present (100%), with 26.1% showing signs of icterus. Specific abdominal findings were present in 69.6% of cases. The Mantoux test results showed that 2.3% of abdominal TB patients had negative results, and 4.2% had a reaction greater than 15 mm.

Shah et al[33] reported that Abdominal TB affects a higher proportion of individuals older than 5 years (63.6%) and shows a significant male predominance (81.8%). Fever is present in 90.9% of cases, and loss of appetite in 36.4%. Malnutrition is found in 54.5% of cases, and anemia in 18.2%. Increased platelet count is observed in 18.2% of cases, with raised ESR in 40% and lymphocytosis in 17.4%. BCG vaccination is seen in 100% of cases, with no drug-resistant TB reported.

Ksoo et al[35] in their study showed that isolated abdominal TB was seen in only eight cases (5.3%) but a total of 26 children (17.3%) had associated abdominal involvement. The mean and median ages were 11 years. Positive contact with TB was present in 31%. The most common presenting complaints were pain abdomen at 54%; fever, cough and significant weight loss at 31% each; abdominal distension at 27%; and loose stools at 11.5%. The commonest ultrasound findings were ascites in 61.5%; abdominal lymphadenopathy in 31%; peritoneal thickening in 11.5%; ileocaecal thickening in 7.7%; septations, granulomatous peritonitis and omental caking were seen in 4% each. In ascitic fluid analysis, there was lymphoid predominance in 61.5%. ADA levels were high at 31%. Acid-fast bacilli (AFB) was present in ascitic fluid and from fine needle aspiration cytology (FNAC) of abdominal lymph nodes in 7.7%. In a study by Ashna et al[34] Abdominal TB presented with abdominal distension, abdominal pain and chronic diarrhea.

Findings for CNS TB

In the study, patients with CNS TB had a mean age of 8.27 years with a standard deviation of 3.59. The gender distribution showed that 50% of CNS TB cases were female. Common symptoms among CNS TB patients included fever (81.3%), loss of appetite (62.5%), weight loss (56.3%), cough (31.3%), and abdominal pain (12.5%). Notably, 62.5% of CNS TB patients experienced respiratory distress, and 43.8% had hematological system involvement. On examination, pallor was present in 75% of CNS TB cases, and neurological findings were observed in 93.8% of the cases. The Mantoux test results indicated that 25% of CNS TB patients had a reaction greater than 15 mm, while 18.8% had negative results. The Interferon-Gamma Release Assay (IGRA) was positive in 34.8% in CNS TB.

Shah et al [33] reported that CNS TB also primarily affects children aged 5 years or younger (60%) and shows a higher male prevalence (60%). Fever is present in 95% of cases, and loss of appetite is notably high (65%). Half of the cases are malnourished (50%), and 35% have anemia. Increased platelet count is observed in 41.2% of cases. Raised ESR is significantly high at 86.7%, and lymphocytosis is found in 51.5%. All patients have received BCG vaccination, and drug-resistant TB is not observed in this group.

Ksoo et al[35] showed the mean age for isolated CNS TB was 6.2 years, with a median age of 6 years, while all CNS TB cases had a mean age of 10.2 years and a median age of 7 years. More than half of the patients were under 5 years old (46.7% for isolated CNS TB and 39.3% overall). Fever was common in both groups (68.9% in isolated CNS TB and 70.5% overall), as were symptoms like altered sensorium (42.2% vs. 37.7%), seizures (41.3% vs. 37.7%), vomiting (36.9% vs. 37.3%), and headache (26.7% vs. 29.5%). Positive contact with TB was noted in 24.4% of isolated CNS TB cases and 24.6% overall. CSF analysis showed lymphocytic predominance in 37.8% of isolated CNS TB cases and 45.9%

overall, with elevated CSF ADA levels (>10) in 20.8% and 23% respectively.

Ashna et al[34] showed that neurological TB or TBM most commonly presented with fever, seizures, altered sensorium and neurological deficits.

Patients with disseminated TB had a mean age of 10.33 years with a standard deviation of 5.19. In terms of gender distribution, 60% of disseminated TB cases were female. Symptomatically, disseminated TB patients frequently reported fever (100%), loss of appetite (90%), weight loss (80%), cough (80%), and abdominal pain (60%). Hematological system symptoms were prevalent in 100% of disseminated TB cases, and 90% experienced respiratory distress. On examination, pallor was universally present (100%), with 20% showing signs of icterus. Specific chest findings were present in 80% of cases. The Mantoux test results showed that 40% of disseminated TB patients had a reaction greater than 15 mm, while 20% had negative results. The IGRA was positive in 17.4% in disseminated TB.

In the study by Ksooet al[35]disseminated TB was the most common presentation of TB seen in our study. The mean age was 10.5 ± 7.9 years, with nine (19%) children under five years, 13 (27.7%) between the age group of 6-10 years and 25 (53%) children above 10 years. The youngest child was a four-month-old with miliary tuberculosis. The smear positivity was seen in 15 out of 34 cases (44%). Weight for age ≤3rd percentile was found in 23 out of 33 children (69.7%) with a mortality of three (21.4%).

For patients categorized under "other TB,"(TB lymphadenitis) the mean age was 9.85 years with a standard deviation of 4.39. The gender distribution revealed that 64.3% of other TB cases were male. Common symptoms in this group included fever (100%), loss of appetite (78.6%), weight loss (85.7%), cough (64.3%), and abdominal pain (50%). Notably,

57.1% of other TB patients experienced respiratory distress, and 85.7% had hematological system involvement. On examination, pallor was present in 85.7% of other TB cases, and specific findings were observed based on the affected organ. The Mantoux test results indicated that 28.6% of other TB patients had a reaction greater than 15 mm, while 14.3% had negative results. The Interferon-Gamma Release Assay (IGRA) was positive in 13% of other TB patients.

In study by Ksoo et al[35] mean and median age of presentation is 9.7 and nine years respectively. FNAC done in eight cases were suggestive of caseating granulomatous lymphadenitis and three (37.5%) were positive for AFB. In a study by Ashna et al Tubercular lymphadenitis presented with enlarged matted lymph nodes with pressure effects if they were large enough.

LIMITATION

1. This study was a single-center investigation conducted exclusively at the Department of Paediatrics, Dayanand Medical College and Hospital, Ludhiana. The results and findings, therefore, reflect the patient population and clinical practices specific to this institution. To gain a more comprehensive understanding of tuberculosis (TB) and its various clinical manifestations, multicentric studies involving multiple healthcare centers are necessary.

2. Tuberculosis (TB) predominantly affects individuals from lower socio-economic groups, who represent a significant portion of the population. These groups often have limited access to healthcare facilities and may not present themselves to tertiary care centers like the one in this study. Consequently, the patient sample size for this study was relatively small. The underrepresentation of this larger demographic in tertiary centers underscores the need for community-based studies and outreach programs.

SUMMARY AND CONCLUSION

SUMMARY

Based on the findings of the present study on pediatric tuberculosis (TB) at Dayanand Medical College and Hospital, Ludhiana, several key conclusions can be drawn:

1. **Age Distribution**: The study revealed a higher frequency of TB cases among older children, with the 11-15 years age group showing the highest prevalence. This aligns with regional studies suggesting that older children are more susceptible to TB, possibly due to delayed healthcare-seeking behaviors and contact tracing issues among adults with TB.
2. **Gender Distribution**: The gender distribution was nearly balanced, with 52% males and 48% females affected. This contrasts with some regional studies showing varying gender disparities, highlighting potential regional or epidemiological factors influencing TB incidence among children.
3. **Clinical Symptoms**: Fever was the most common symptom, reported in 92% of patients, followed by loss of appetite (73.3%) and weight loss (65.3%). These symptoms are consistent with typical presentations of pediatric TB, emphasizing the need for early detection and treatment.
4. **Types of TB**: Pulmonary TB was the most prevalent type (32.0%), followed closely by abdominal TB (30.7%) and CNS TB (29.3%). This distribution underscores the varied clinical manifestations of TB in pediatric patients, necessitating comprehensive diagnostic approaches.
5. **Malnutrition**: A significant portion of patients (48%) had a weight percentile of less than 3, indicating a high prevalence of malnutrition among pediatric TB cases. This highlights the intersection between TB and malnutrition, which can exacerbate disease severity and treatment outcomes.

6. **Diagnostic Methods**: The study employed various diagnostic tools such as Mantoux test, IGRA, and CBNAAT, each contributing to the confirmation and management of TB cases. IGRA showed a high positivity rate (69.3%), suggesting its efficacy in detecting TB infection among children.
7. **Radiological Findings**: Most cases (68%) showed no abnormalities on chest X-ray, with specific findings including perihilar lymph nodes (12.0%) and pleural effusion (14.7%). This variability in radiological findings underscores the challenges in diagnosing pediatric TB solely based on imaging.
8. **Treatment and Outcome**: Significant weight gain was observed among patients during follow-up, indicating positive treatment outcomes with anti-tubercular therapy (ATT). The mean weight increased from 30.923 kg at admission to 34.767 kg at the last follow-up, demonstrating statistically significant improvement.

In conclusion, the study provides valuable insights into the epidemiology, clinical manifestations, and diagnostic challenges of pediatric TB in Ludhiana, India. It underscores the need for early diagnosis, comprehensive treatment strategies, and nutritional support to improve outcomes in this vulnerable population.

CONCLUSION

The study on pediatric tuberculosis (TB) at Dayanand Medical College and Hospital, Ludhiana, reveals important insights into the epidemiology, clinical presentation, and management of TB in children. Key findings include a predominance of older children affected, with pulmonary TB being the most common type. Clinical symptoms such as fever and weight loss were prevalent, alongside a significant association with malnutrition. Diagnostic tools like IGRA showed high efficacy, despite varied radiological findings complicating diagnosis.

Steps Forward

1. **Enhanced Diagnostic Protocols**: Implementing comprehensive diagnostic protocols integrating IGRA alongside traditional methods like Mantoux test can enhance early detection and treatment initiation.
2. **Nutritional Support**: Introducing nutritional interventions tailored to pediatric TB patients, focusing on improving weight gain and overall nutritional status, could improve treatment outcomes.
3. **Public Health Awareness**: Increasing awareness campaigns targeting parents, caregivers, and healthcare providers about pediatric TB symptoms, risk factors, and preventive measures can aid in early detection and timely intervention.
4. **Multi-disciplinary Approach**: Adopting a multi-disciplinary approach involving pediatricians, pulmonologists, nutritionists, and social workers can ensure holistic care for pediatric TB patients, addressing both medical and socio-economic factors.
5. **Research and Surveillance**: Continual research and surveillance to monitor TB trends among children, evaluate treatment outcomes, and adapt strategies based on local epidemiological data are essential for effective disease control.

By implementing these steps, healthcare systems can enhance their capacity to diagnose, treat, and manage pediatric TB effectively, ultimately improving health outcomes and reducing the burden of TB among children in the region.

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KEY TO MASTER CHART

1. IGRA

1. negative

2. positive

2. Residence

1. Ludhiana 2. Jammu 3. Gurdaspur 4. Hoshiarpur 5. Bathinda 6. Patiala
7. Jalandhar 8. Moga 9. Barnala 10. Fazilka 11. Amritsar

3. Fever

0. Absent

1. Present

4. Cough

0. Absent

1. Present

5. Loss appetite

0. Absent

1. Present

6. Pain Abdomen

0. Absent

1. Present

7. Loose stools

0. Absent

1. Present

8. Headache

0. Absent

1. Present

9. Seizures

0. Absent

1. Present

10. Neurological deficit

0. Absent

1. Present

11. Swelling

0. Absent

1. Present

12 Back pain

0. Absent

1. Present

13. wheezing

0. Absent

1. Present

14. weight loss

0. Absent

1. Present

15. Renal symptoms

0. Absent

1. Present

16 Cardiac Symptoms

0. Absent

1. Present

17. Respiratory symptoms

0. Absent

1. Present

18. Muscuskeltal symptoms

0. Absent

1. Present

19. Hematological Symptoms

0. Absent

1. Present

20. weight Percentile

0. Absent

1. Present

21. Weight Gain

0. Absent

1. Present

22. Pallor

0. Absent

1. Present

23. Icterus

0. Absent

1. Present

24. Lympadenopathy

0. Absent

1. Present

25. Chest

0. Absent

1. Present

26. ESR

1. Negative

2. Positive

27 Mantoux

1. <5mm

2. 6-10mm

3. 11-15mm

4. >15mm

28 Contact

0. No

1. Present

29. Already On ATT

0 No

1 yes

30. Steroids

0. No

1. Yes

31. Anticonvulsant

0. No

1. yes

32. DILI

0. No

1. yes

S. No.	Name	Age	IGRA	Sex	Residence	Ludhiana	MRD	hospital stay	Fever	fever days	Cough	Loss appetite	vomitings	Pain abdomen	loose stools	headache	seizures	neurological deficit	swelling	Back pain	wheezing	weight loss	Renal symptoms	Cardiac symptoms	resp distress	musculo skeletal symptom	Hematological system
1	RK	6	1	F	1	a	1305924	4.00	1	30	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1
2	K	13	1	M	2		1304283	5.00	1	7	1	1	0	1	0	0	0	DOWN SYNDROME	0	0	0	1	0	0	1	0	1
3	SK	16	2	F	3		1293812	13.00	1	180	1	1	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1
4	K	13	1	F	1	b	1550714	6.00	1	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1
5	S	2	1	M	1	c	1599575	6.00	1	15	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
6	H	12	1	M	1	d	1470108	7.00	1	60	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
7	A	18	2	M	1	d	1354119	3.00	1	30	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8	JS	1	1	M	10		1440237	7.00	0	20	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
9	HK	16	2	F	1	g	1263585	6.00	1	5	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
10	HS	12	1	M	4		1271648	14.00	1	14	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1
11	SS	5	1	M	1	t	1658433	5.00	1	14	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1
12	V	6	1	M	5		1512626	4.00	1	30	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
13	SK	16	2	F	3		1293812	13.00	1	180	1	1	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1
14	P	13	1	F	3		1291129	3.00	1	4	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
15	T	16	1	F	1	h	1287799	11.00	1	5	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
16	SS	15	1	F	2		1247974	2.00	1	30	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
17	AS	15	2	F	1	i	1036907	9.00	1	30	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
18	YA	10	2	M	1	j	1646739	6.00	1	30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
19	C	12	1	F	1	l	1559656	5.00	1	180	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1
20	S	17	2	M	1	i	1456945	9.00	1	90	1	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	1
21	UG	13	1	F	6		9988138	6.00	1	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1
22	M	14	1	M	1	i	1457697	14.00	1	30		1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
23	S	6	1	M	7		1512486	4.00	1	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
24	N	13	1	M	7		1652846	9.00	1	20	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
25	HG	14	1	F	8		1566942	3.00	1	20	1	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0
26	A	13	1	M	1	m	1456154	8.00	1	3	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0
27	SK	13	1	M	9		1291948	2.00	0	4	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1
28	I	13	1	M	1	n	1324649	6.00	0	7	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
29	H	2	1	M	7		1447831	28.00	1	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
30	JS	1	1	M	10		1440237	7.00	0	3	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
31	N	12	2	F	1	g	1436362	7.00	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
32	T	6	1	M	1	p	1251417	5.00	1	5	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	0	1
33	S	4	1	F	1	w	1551383	8.00	0	5	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	1
34	RR	17	2	M	1	i	1423396	29	1	180	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
35	S	1	1	M	1	q	1440239	5.00	1	15	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0
36	J	13	2	F	2		1417752	4.00	1	15	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	1
37	A	9	2	F	1	r	1431834	5.00	1	20	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
38	G	5	1	F	1	s	836427	5.00	1	4	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1

S. No.	Type of anemia	Vitals-PR	RR	SBP	DBP	Weight	percentile	weight at discharge	wt at first followup	weight -3 months	weight Gain	weight at end	Height	z score weight for age	z score wt/height	percentile	BMI	percentile	Pallor	Icterus	Lymphade0pathy	Chest	Abdomen	CVS	CNS
1	mild anemia	70	26	100	60	16	1	15	15	15	1	17	111.5	-2	1	3-50 centile	13	<3 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
2	moderate	136	26	106	70	21.3	1	40	40	38	0	32	128	-3	-3	<3rd	13	<3rd	1	0	rt cervical 1X1 cm	crepts	NAD	NAD	NAD
3	mild anemia	84	16	90	60	27	1	27	27	27	0	28	158	-3	-2	<3rd centile	11	<3rd centile	1	0	0	crepts	NAD	soft heart sounds	drowsy-post ictal
4	mild anemia	90	21	100	70	61	3	61	63	61	0	60	153	0	-2	3-50 centile	26	>50 centile	1	0	0	1	NAD	NAD	NAD
5	mild anemia	92	40	100	80	8.9	2	9	9	9.5	1	9.5	77	0	0	<3rd	13	<3rd	1	0	0	NAD	NAD	NAD	HYDROCEPHALUS
6	moderate	88	20	110	70	35	2	35	39	42	1	47	140	-1	-1	3-50 centile	18	50 centile	1	0	1 perihilar	crepts	NAD	NAD	NAD
7	moderate	78	20	110	70	38	2	38	42	46	1	50	155	-3	-2	3-50 centile	16	3-50 centile	1	0	1 Hilar	crepts	NAD	NAD	NAD
8	moderate	94	20	100	60	10	2	11	12	121	0	12	72	0	-1	3-50 centile	16	3-50 centile	1	1	0	NAD	NAD	NAD	weakness
9	severe anemia	94	24	108	80	26	1	26	27	28	1	30	138	-3	-3	<3rd centile	13	<3rd centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
10	moderate	150	32	100	60	30	2	30	30	35	1	38	143	-1	0	50-95 cetile	14.7	3-50 centile	1	0	0	crepts	NAD	NAD	NAD
11	moderate	150	32	100	60	30	2	30	30	35	1	38	143	2	2	50-95 cetile	14.7	3-50 centile	1	0	0	crepts	NAD	NAD	NAD
12	mild anemia	100	28	100	70	26	2	26	28	28	1	30	118	1	0	50 centile	20	90 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
13	mild anemia	84	16	90	60	27	1	27	27	27	0	28	158	-3	-2	<3rd centile	11	<3rd centile	1	0	0	crepts	NAD	soft heart sounds	drowsy-post ictal
14	moderate	72	24	100	60	30	2	30	30	32	1	38	138	-2	-2	3-50 centile	16	3-50 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
15	severe anemia	94	24	108	80	26	1	26	27	28	1	30	138	-3	-2	<3rd centile	13	<3rd centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
16	severe anemia	102	32	100	60	34	1	34	34	36	1	42	150	-1	0	3-50 centile	15	<3rd centile	1	0	0	crepts	NAD	NAD	NAD
17	mild anemia	116	24	100	70	36	1	38	40	42	1	44	145	-1	-1	3-50 centile	12	<3rd centile	1	0	0	NAD	NAD	NAD	NAD
18	mild anemia	90	22	110	70	34	1	34	34	36	1	42	150	-1	0	3-50 centile	16	3-50 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
19	moderate	90	22	100	70	24	1	24	26	26	1	26	149	-3	0	50 centile	10	<3rd centile	1	0	0	NAD	NAD	NAD	NAD
20	mild anemia	84	20	110	70	42	2	42	42	42	0	42	164	0	1	>50centile	15	<3rd centile	1	1	0	NAD	1	NAD	NAD
21	mild anemia	90	21	100	70	61	3	61	63	61	0	60	153	1	0	3-50 centile	26	>50 centile	1	0	0	1	NAD	NAD	NAD
22	moderate	68	18	110	70	32	1	32	33	35	1	38	148	-2	-2	3-50 centile	14	3-50 centile	1	0	1	NAD	1	NAD	NAD
23	severe anemia	100	28	80	40	14	1	14	14	14	0	14	144	-3	0	50 centile	10	<3rd centile	1	0	1 abdominal	NAD	1	NAD	NAD
24	moderate	124	18	110	70	35	2	35	37	38	1	40	151	-1	2	3-25 centile	15	3-50 centile	1	0	1 abdominal	NAD	1	nad	nad
25	severe anemia	78	20	100	80	34	1	34	34	36	1	42	150	-1	0	3-50 centile	15	3-50 centile	1	0	0	1	NAD	NAD	nad
26	mild anemia	122	48	100	60	50	2	50	50	50	0	55	160	0	0	>50 centileq	19.6	>50 centile	1	0	0	1	NAD	NAD	NAD
27	mild anemia	94	24	100	60	44	1	44	46	48	1	48	132	0	-1	3-50 centile	14	3-50 centile	1	0	1	NAD	NAD	NAD	NAD
28	mild anemia	98	16	90	60	36	1	38	40	40	1	42	146	-1	-1	3-50 centile	16	<3rd centile	1	1	0	NAD	1	NAD	NAD
29	severe anemia	146	60	90	60	11	2	11	11	12	1	13	90	0	0	>50 centile	15	3-50 centile	1	0	0	NAD	NAD	NAD	NAD
30	moderate	94	20	100	60	10	2	11	12	121	0	12	72	-1	-1	3-50 centile	16	3-50 centile	1	1	0	NAD	NAD	NAD	weakness
31	mild anemia	120	24	100	70	29	2	30	30	32	0	30	150	-1	0	50 centile	13	3-50 centile	1	0	0	1	NAD	NAD	NAD
32	severe anemia	100	28	80	40	14	1	14	14	14	0	14	144	-2	0	50 centile	10	<3rd centile	1	0	1 abdominal	NAD	1	NAD	NAD
33	mild anemia	94	28	100	70	18	2	18	17	15	0	15	109	-1	-1	3-50 centile	15	3-50 centile	1	0	0	NAD	1	NAD	NAD
34	mild anemia	64	18	100	60	35	2	35	35	36	1	38	140	-3	-2	3-50 centile	18	50 centile	1	0	0	NAD	NAD	NAD	NAD
35	mild anemia	84	20	110	66	31	1	31	33	34	1	36	155	0	0	3-50 centile	13	<3rd centile	1	0	0	NAD	1	NAD	NAD
36	moderate	74	16	90	60	50	2	50	50	48	0	50	154	1	1	50-75 centile	21	50-95 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
37	mild anemia	80	20	100	70	30	2	30	30	30	0	31	132	0	1	>50 centile	17	>50centile	1	0	0	NAD	NAD	NAD	GTCS
38	moderate	130	32	110	60	12	1	12	13	12	0	13	99	-3	-2	<3 centile	12	3-50 centile	1	0	0	NAD	NAD	NAD	NAD

S. No.	Local examination	Provisional diag0sis	shifted - ward/PICU	GA CBNAAT	sputum-CBNAAT	Other CBNAAT	Drug resistant TB	LPA for drug resis	HIV	FNAC	CXR	USG ABD	imaging	Hb	MCV	RDW	WBC	Poly	Lympho	Mo0
1	NAD	Meningitis ? TB	PICU	negative	positive medium	0	0 to rifampicin	0ne	0.1	nd	rt hilar lymphade0pathy	0t done	MRI BRAIN:Multiple granulomatous lesion showing 0dular ond ring enhancemenl in bilaleral cerebral and cerebellar hemispheres, pons and right basol ganglia	11	75	22	12	78	32	8
2	NAD	? Pul TB	ward	negative	positive low	0	0 to rifampicin	0ne	0.1	nd	bl scattered opacities	0t done	0t done	7.6	75.7	22.1	9	57.9	32.6	8.2
3	NAD	Pulmonary TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	abdominal lymphade0pathy	CT HEAD 0RMAL	11.3	80	17	5	90	6	3.3
4	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	perihilar	0t done	0t done	11	79	14	4	70	30	3
5	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	CT HEAD Cmmunicating Hydeocephalus	11	72	24	7	54	35	8
6	NAD	Pulmonary TB	ward	positive high	negative	0	0 to rifampicin	0ne	0.1	nd	perihilar	0t done	0t done	11	74	22	8	60	32	7
7	NAD	Pulmonary TB	ward	positive high	negative	0	0 to rifampicin	0ne	0.1	nd	perihilar	0t done	0t done	10	76	25	11	60	38	8
8	nad	CNS TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	8.4	61	18	21	78	32	3
9	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	7.7	66	20	5	73	15	10
10	NAD`	Pulmonary TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	pleural effusion	0t done	0t done	9	75	24	12	58	40	6
11	NAD`	Pulmonary TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	pleural effusion	0t done	0t done	9	75	24	12	58	40	6
12	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	0rmal	0t done	MRI Brain bilateral tiny 0ddules in cerebeller hemispheres	12	78	31	6	73	24	2
13	NAD	Pulmonary TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	abdominal lymphade0pathy	CT HEAD 0RMAL	11.3	80	17	5	90	6	3.3
14	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN TUBERCULAR MENINGITIS	9.4	30	18	7	86	10	3
15	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	7.7	66	20	5	73	15	10
16	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	0t done	CT Chest bilateral millary patteen of Tb	7.6	82	15	3.5	78	20	3
17	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	10.2	74	74	14	68	20	4
18	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN TUBERCULAR MENAINGITIS	12.1	78	16	3.3	78	24	3
19	NAD	Abdominal TB	ward	positive high	positive low	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	CT ABDOMEN- TERMINAL ILEITIS	8.2	76	18	10.2	78	25	3
20	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	11.2	70	15	6.5	78	24	3
21	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	perihilar	0t done	0t done	11	79	14	4	70	30	3
22	nad	Abdominal TB	ward	positive high	positive	0	0 to rifampicin		0.1	nd	0rmal	abdominal lymphade0pathy	0t done	8.6	89	10	19	89	36	3
23	NAD	Abdominal TB	PICU	positive high	negative		0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	9	75	24	14	70	38	3
24	nad	Abdominal TB	ward	negative	negative	fnac	0 to rifampicin	0ne	0.2	nd	0rmal	abdominal lymphade0pathy	0t done	9.8	75	16	10	78	32	3
25	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	0t done	12	30	18	7	86	10	3
26	NAD	Pulmonary TB	picu	positive high	negative	pleural fluid MTB	0 to rifampicin	0ne	0.1	nd	pleural effusion	0t done	0t done	12	71	21	10	76	32	3
27	NAD	lympatic TB	OPD	negative	negative	0	0 to rifampicin	0ne	0.2	nd	0rmal	lymphatic	0t done	12	75	23	8	78	34	3
28	NAD	Pulmonary TB	WARD	negative	negative	FNAC	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	11	75	24	12	75	34	3
29	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	perihilar	0t done	CT chest consolidation	7	51	27	8	78	34	3
30	nad	CNS TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	8.4	61	18	21	78	32	3
31	NAD	Pulmonary TB	WARD	positive high	negative	0	1 to Rifampicin	0ne	0.1	nd	perihilar	0t done	0t done	10	70	23	6	78	32	3
32	NAD	Abdominal TB	PICU	positive high	negative	HISTO	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	7	75	24	14	70	38	3
33	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0rmal	MRI BRAIN Ring ehancing lesion	11	77	15	10	78	36	3
34	NAD	Pulmonary TB	OPD	negative	positive	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	11	72	16	6.5	78	24	3
35	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	CT ABDOMEN- Abdominal Lymade0pathy	12	80	16	11	76	38	4
36	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	10	34	16	16	78	34	3
37	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	11	76	16	9	78	36	3
38	NAD	Pulmonary TB	PICU	negative	positive	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	9	78	22	24	74	38	3

S. No.	Platelets	ESR	Mantoux	Urea	Creatinine	Na	K	SGOT	SGPT	TB	DB	ALP	TP	ALB	Other investigations	Vaccination status	Development/ IQ	Socioeco0mic status	Contact	Already on ATT	Steroids	Anticonvulsants	ATT start	DILI	Final diag0sis	Outcome	Type of TB
1	>3lakh	2	1	18	0.6	139	4,3	40	35	0.3	0.3	200	6	3.2		seen	normal	lower upper	0	0	0	1	19/06/2022	0	CNS tubecucosis	DOR	Extrapulmonary TB
2	>3 lakh	2	3	16	0.6	140	4.6	26	11	0.4	0.1	166	8.8	3.12	Thyroid profile=0rmal,anti TTG=1.1 S Iron=27.6	0t seen	delayed/low	0t done	1	0	0	0	19-05-2022	0	pulm TB Anemia DOWN SYNDROME	discharged	Pulmonary TB
3	>4 lakh	1	1	23	0.41	136	4.94	14	20	2.42	1.53	205	4	1.8		0t seen	0rmal	upper lower	1	0	0	0	19/04/2022	1	disseminated TB	discharge	Disseminated TB
4	>1 lakh	2	3	20	0.4	139	4.7	53	40	0.3	0.2	200	6	4		0t seen	0rmal	lower middle	1	0	0	0	03-07-2024	0	pulmonary TB	discharge	pulmonary TB
5	>3lakh	2	1	16	0.5	138	4.4	30	24	0.2	0.2	158	7	3.7		0t seen	0rmal	lower middle	0	0	1	1	10-05-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
6	>3 lakh	1	3	18	0.6	134	4.3	32	28	0.3	0.2	142	7	3.4		0t seen	0rmal	lower upper	1	0	0	0	03-01-2022	0	pulmonary TB	discharge	Pulmonary TB
7	>3 lakh	2	1	22	0.6	135	4.5	34	32	0.3	0.3	128	6	4		seen	0rmal	upper lower	1	0	0	0	16/08/2022	0	pulmonary TB	discharge	Pulmonary TB
8	>9 lakh	2	1	25	0.18	134	5	26	6	0.3	0.3	200	6	3.4		0t seen	0rmal	upper middle	1	0	1	0	01-03-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
9	>1 lakh	2	1	16	0.13	133	3.75	48	25	0.6	0.1	130	8	4		0t seen	0rmal	lower middle	0	0	1	0	16/04/2024	0	CNS tubecucosis	discharge	Extrapulmonary TB
10	258	2	3	8	0.3	140	4.8	31	24	0.5	0.2	413	7	4		0t seen	0rmal	lower middle	1	0	0	0	18/03/2022	0	pulmonary TB	DOR	pulmonary TB
11	258	2	3	8	0.3	140	4.8	31	24	0.5	0.2	413	7	4		0t seen	0rmal	lower middle	1	0	0	0	18/03/2022	0	pulmonary TB	DOR	pulmonary TB
12	>3 lakh	1	1	29	0.3	135	5.06	27	13	0.3	0.1	178	8	4.8		0t seen	0rmal	upper lower	0	0	1	1	05-09-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
13	>4 lakh	1	1	23	0.41	136	4.94	14	20	2.42	1.53	205	4	1.8		0t seen	0rmal	upper lower	1	0	0	0	19/04/2022	1	disseminated TB	discharge	Disseminated TB
14	>3 lakh	2	1	39	0.5	133	4.5	22	17	0.6	0.2	121	8	4		0t seen	0rmal	lower middle	1	0	1	1	29/04/2022	0	CNS tubecucosis	discharge	Extrapulmonary TB
15	>1 lakh	2	1	16	0.13	133	3.75	48	25	0.6	0.1	130	8	4		0t seen	0rmal	lower middle	0	0	1	0	16/04/2024	0	CNS tubecucosis	discharge	Extrapulmonary TB
16	> 3 lakh	2	3	10	0.3	140	3.9	42	16	0.3	0.1	200	7.3	3.4		0t seen	0rmal	upper middle	1	0	0	0	09-02-2023	0	pulmonary TB	discharge	pulmonary TB
17	>2 lakh	2	3	21	0.4	138	4.4	42	26	0.5	0.1	188	8	3.6		0t seen	0rmal	lower middle	1	0	0	0	09-02-2022	0	abdominal TB	discharge	Extrapulmonary TB
18	> 2lakh	1	1	20	0.3	140	4.3	40	17	0.3	0.2	200	8	3.3		0t seen	0rmal	lower middle	1	1	1	1	09-02-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
19	>1 lakh	2	4	23	0.2	133	5	6	90	0.3	0	184	3	2		0t seen	0rmal	Upper middle	1	0	0	0	01-08-2024	0	abdominal TB	discharge	Extrapulmonary TB
20	>4 lakh	2	4	8	0.97	135	4	24	652	1.6	1.4	200	7	3		0t seen	0rmal	lower middle	1	1	0	0	17/6/2023	1	abdominal TB	discharge	Extrapulmonary TB
21	>1 lakh	1	4	20	0.4	139	4.7	53	40	0.3	0.2	200	6	4		0t seen	0rmal	lower middle	1	0	0	0	03-07-2024	0	pulmonary TB	discharge	pulmonary TB
22	> 2 lakh	2	1	10	0.3	129	4	20	12	0.2	0.1	536	4	1.4		0t seen	0rmal	lower middle	1	0	0	0	04-05-2023	0	abdominal TB	discharge	Extrapulmonary TB
23	>1 lakh	2	1	50	2.8	130	6	80	10	0.3	0.2	300	7	4		0t seen	0rmal	lowe middle	1	1	0	0	14/7/2023	1	abdominal TB	discharge	Extrapulmonary TB
24	>3 lakh	1	4	21	0.3	135	4.4	23	18	0.4	0	125	7	4	FNAc	seen	0rmal	lower middle	1	0	0	0	15/12/2023	0	abdominal TB	discharge	Extrapulmonary TB
25	>3 lakh	2	1	39	0.5	133	4.5	22	17	0.6	0.2	121	8	4	pleuaral fluid	0t seen	0rmal	lower middle	1	0	1	1	08-08-2023	0	pulmonary TB	discharge	Pulmonary TB
26	>1 lakh	2	1	19	0.7	138	4	64	56	1.2	0.18	218	6	3		0t seen	0rmal	lowe middle	1	0	0	0	28/10/2022	0	pulmonary TB	discharge	Extrapulmonary TB
27	>2 lakh	1	4	21	0.3	135	4	40	25	0.3	0.4	218	7	4		0t seen	0rmal	lowe middle	1	0	0	0	08-10-2023	0	lymph 0de TB	discharge	Extrapulmonary TB
28	>2 lakh	2	1	12	0.3	140	4	20	20	0.3	0.4	218	7	4		0t seen	0rmal	upper middle	1	0	0	0	23/6/2022	0	abdominal TB	discharge	Extrapulmonary TB
29	>1 lakh	2	1	12	0.3	138	3	24	28	0.3	0.3	220	7	3.5		0t seen	0rmal	upper middle	0	0	0	0	29/1/2023	0	pulmonary TB	discharge	pulmonary TB
30	>9 lakh	2	1	25	0.18	134	5	26	6	0.3	0.3	200	6	3.4		0t seen	0rmal	upper middle	1	0	1	0	01-03-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
31	>3 lakh	1	4	18	0.4	135	4	45	40	0.4	0.1	134	6	3.2		0t seen	0rmal	lowe middle	1	0	0	0	14/02/2023	0	pulmonary TB	discharge	pulmonary TB
32	>1 lakh	2	1	50	2.8	130	6	80	10	1.4	1.9	300	7	1.8		0t seen	0rmal	lowe middle	1	0	0	0	14/7/2023	1	abdominal TB	expired	Extrapulmonary TB
33	>4lakh	2	3	28	0.3	137	4	237	238	1.2	1.3	300	7	2.3		0t seen	0rmal	upper middle	1	1	1	1	15/05/2023	1	CNS tubecucosis	DOR	Extrapulmonary TB
34	>4 lakh	1	4	8	0.97	135	4	24	652	1.6	1.4	200	7	3		0t seen	0rmal	upper lower	1	1	0	0	17/6/2023	1	pulmonary TB	discharge	pulmonary TB
35	>3lakh	2	1	20	0.4	136	4	28	27	0.2	0.3	200	7	3.5		0t seen	0rmal	lower middle	1	0	0	0	01-10-2023	0	abdominal TB	discharge	Extrapulmonary TB
36	>2 lakh	2	1	16	0.3	134	4	30	20	0.3	0.2	200	6	4		seen	0rmal	upper lower	1	0	0	0	22/11/2022	0	CNS tubecucosis	discharge	Extrapulmonary TB
37	>4lakh	1	1	136	0.3	126	4	34	18	0.3	0	200	7	3.8		seen	0rmal	upper lower	1	0	0	0	22/03/2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
38	>3lakh	1	3	21	0.3	131	4	42	49	0.3	0.3	400	7	3.4		seen	0rmal	upper lower	0	0	0	0	03-08-2024	0	pulmonary TB	discharge	pulmonary TB

S. No.	Name	Age	IGRA	Sex	Residence	Ludhiana	MRD	hospital stay	Fever	fever days	Cough	Loss appetite	vomitings	Pain abdomen	loose stools	headache	seizures	neurological deficit	swelling	Back pain	wheezing	weight loss	Renal symptoms	Cardiac symptoms	resp distress	musculo skeletal symptom	Hematological system
39	G	12	1	F	7		1401897	11.00	0	12	0	0	1	0	0	1	1	FTT	0	0	0	0	0	0	0	0	0
40	D	10	2	M	7		1459737	7.00	1	180	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
41	L	4	1	M	8		1368498	23.00	1	3	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1
42	RK	5	2	M	1	t	1658433	5.00	1	60	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
43	D	6	1	M	5		1512626	4.00	1	30	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
44	A	16	1	F	3		1293812	13.00	1	180	1	1	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1
45	S	13	1	F	3		1291129	3.00	1	4	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
46	R	16	1	F	1	h	1287799	11.00	1	5	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
47	K	15	1	F	2		1247974	2.00	1	30	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
48	S	15	2	F	1	i	1036907	9.00	1	30	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
49	A	10	1	M	1	j	1646739	6.00	1	30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
50	0M	12	1	F	1	l	1648965	5.00	1	180	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1
51	P	17	2	M	1	i	1297854	9.00	1	90	1	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	1
52	Y	13	1	F	6		1459845	6.00	1	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1
53	P	14	1	M	1	i	1462985	13.00	1	30	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
54	R	6	1	M	7		1248765	4.00	1	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	S	13	2	M	7		1248456	9.00	1	20	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
56	D	14	2	F	11		1654792	7.00	1	10	1	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0	1
57	B	18	1	F	1	u	1648956	11.00	1	5	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
58	D	6	1	F	1	i	1305924	4.00	1	30	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1
59	J	17	2	M	1	v	9335265	3.00	1	15	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	1
60	L	16	2	M	7		1754243	13.00	1	180	1	1	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1
61	G	9	1	F	7		1673234	5.00	1	20	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
62	S	15	2	F	2		1247974	2.00	1	30	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
63	R	15	2	F	1	i	1036907	9.00	1	30	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
64	V	10	1	M	1	j	1646739	6.00	1	30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
65	N	12	1	F	1	l	1549625	5.00	1	180	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1
66	N	17	1	M	1	i	1348465	9.00	1	90	1	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	1
67	R	13	1	F	6		9988138	6.00	1	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1
68	A	14	1	M	1	i	1469852	14.00	1	30	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
69	S	6	1	M	7		1569854	4.00	1	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
70	S	13	1	M	7		1648521	9.00	1	20	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
71	V	14	1	F	8		1566942	3.00	1	20	1	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0
72	HS	12	1	M	1.00		1523245	14.00	1	14	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1
73	P	13	1	F	1.00		1653876	3.00	1	4	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
74	S	17	1	M	1.00		1528658	9.00	1	90	1	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	1
75	D	14	1	F	2.00		1646863	7.00	1	10	1	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0	1

S. No.	Type of anemia	Vitals-PR	RR	SBP	DBP	Weight	percentile	weight at discharge	wt at first followup	weight -3 months	weight Gain	weight at end	Height	z score weight for age	z score wt/height	percentile	BMI	percentile	Pallor	Icterus	Lymphade0pathy	Chest	Abdomen	CVS	CNS
39	mild anemia	72	24	100	70	29	2	29	30	29	0	30	140	-2	-1	3-50 centile	14	3-25 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
40	mild anemia	132	26	98	64	24	2	24	24	26	1	28	133	-2	-1	3-50 centile	13	3-50 centile	1	0	0	1	1	1	0
41	moderate	150	32	100	60	19	2	12	12	14	1	16	110	0	0	50-95 cetile	14.7	3-50 centile	1	0	0	NAD	1	NAD	NAD
42	moderate	124	24	100	60	15	1	15	15	17	0	20	130	-1	0	3-50 centile	14	3-50 centile	1	0	0	crepts	NAD	NAD	NAD
43	moderate	100	28	100	70	26	2	26	28	28	1	30	118	2	1	50 centile	20	90 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
44	mild anemia	84	16	90	60	27	1	27	27	27	0	28	158	-3	-2	<3rd centile	11	<3rd centile	1	0	0	crepts	NAD	soft heart sounds	drowsy-post ictal
45	mild anemia	72	24	100	60	30	2	30	30	32	1	38	138	-1	-1	3-50 centile	16	3-50 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
46	severe anemia	94	24	108	80	26	1	26	27	28	1	30	138	-2	-2	<3rd centile	13	<3rd centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
47	severe anemia	102	32	100	60	34	1	34	34	36	1	42	150	-2	0	3-50 centile	16	<3 centile	1	0	0	crepts	NAD	NAD	NAD
48	mild anemia	116	24	100	70	36	1	38	40	42	1	44	145	-2	-2	3-50 centile	12	<3rd centile	1	0	0	NAD	NAD	NAD	NAD
49	mild anemia	90	22	110	70	32	2	32	32	34	0	36	132	0	-1	3-50 centile	12	3-50 centile	0	1	0	NAD	NAD	NAD	drowsy-post ictal
50	moderate	90	22	100	70	24	1	24	26	26	1	26	149	-3	0	50 centile	10	<3rd centile	1	0	0	NAD	NAD	NAD	NAD
51	mild anemia	84	20	110	70	42	2	42	42	42	0	42	164	-2	-1	>50centile	15	<3rd centile	1	1	0	NAD	1	NAD	NAD
52	mild anemia	90	21	100	70	61	3	61	63	61	0	60	153	1	0	3-50 centile	26	>50 centile	1	0	0	1	NAD	NAD	NAD
53	moderate	68	18	110	70	32	1	32	33	35	1	38	148	-2	-1	3-50 centile	14	3-50 centile	1	0	1	NAD	1	NAD	NAD
54	moderate	87	21	110	72	26	2	26	28	28	1	30	118	1	0	50 centile	20	90 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
55	moderate	124	18	110	70	35	2	35	37	38	1	40	151	0	1	3-25 centile	15	3-50 centile	1	0	1 abdominal	NAD	1	nad	nad
56	mild anemia	146	28	90	60	43	2	43	43	43	1	45	154	-1	-1	50-75 centile	21	50-95 centile	1	0	0	crepts	NAD	NAD	nad
57	severe anemia	94	24	108	80	26	1	26	27	28	1	30	138	-3	-3	<3rd centile	13	<3rd centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
58	mild anemia	70	26	100	60	16	1	24	25	24	0	28	111.5	-3	-2	3-50 centile	13	<3 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
59	severe anemia	84	20	110	70	40	1	40	40	40	0	40	164	-2	-1	>50centile	15	<3rd centile	1	1	0	1	NAD	NAD	NAD
60	mild anemia	84	16	90	60	27	1	27	27	27	0	28	158	-3	0	<3rd centile	11	<3rd centile	1	0	0	crepts	NAD	soft heart sounds	drowsy-post ictal
61	mild anemia	80	20	100	70	30	2	30	30	30	0	31	132	0	0	>50 centile	17	>50centile	1	0	0	NAD	NAD	NAD	GTCS
62	severe anemia	102	32	100	60	34	1	34	34	36	1	42	150	2	-1	3-50 centile	17	< 3rd centile	1	0	0	crepts	NAD	NAD	NAD
63	mild anemia	116	24	100	70	36	1	38	40	42	1	44	145	-2	-2	3-50 centile	12	<3rd centile	1	0	0	NAD	NAD	NAD	NAD
64	moderate	90	22	110	70	34	1	34	34	36	1	42	150	-3	-1	3-50 centile	22	3-50 centile	1	0	0	NAD	NAD	NAD	drowsy-post ictal
65	moderate	90	22	100	70	24	1	24	26	26	1	26	149	-2	1	50 centile	10	<3rd centile	1	0	0	NAD	NAD	NAD	NAD
66	mild anemia	84	20	110	70	42	2	42	42	42	0	42	164	-2	-1	>50centile	15	<3rd centile	1	1	0	NAD	1	NAD	NAD
67	mild anemia	90	21	100	70	61	3	61	63	61	0	60	153	-1	-1	3-50 centile	26	>50 centile	1	0	0	1	NAD	NAD	NAD
68	moderate	68	18	110	70	32	1	32	33	35	1	38	148	-1	-1	3-50 centile	14	3-50 centile	1	0	1	NAD	1	NAD	NAD
69	severe anemia	100	28	80	40	14	1	14	14	14	0	14	144	-1	-1	50 centile	10	<3rd centile	1	0	1 abdominal	NAD	1	NAD	NAD
70	moderate	124	18	110	70	35	2	35	37	38	1	40	151	-2	-2	3-25 centile	15	3-50 centile	1	0	1 abdominal	NAD	1	nad	nad
71	moderate	78	20	100	80	34	1	34	34	36	1	42	150	-2	-2	3-50 centile	15	3-50 centile	1	0	0	1	NAD	NAD	nad
72	moderate	150	32	100	60	30	30	30	35	1	38	38	143	-2	-2	3-50 centile	15	<3 centile	1	0	0	1	1	NAD	NAD
73	moderate	72	24	100	60	30	30	30	32	1	38	38	138	-1	-1	3-50 centile	18	3-50 centile	1	0	0	0	0	NAD	drowsy-post ictal
74	mild anemia	84	20	110	70	42	42	42	42	0	42	42	164	-2	-2	<3 centile	17	<3 centile	1	1	0	0	0	NAD	NAD
75	mild anemia	146	28	90	60	43	43	43	43	1	45	45	154	-2	-1	<3 centile	16	3-50 centile	1	0	0	1	1	NAD	nad

S. No.	Local examination	Provisional diag0sis	shifted - ward/PICU	GA CBNAAT	sputum-CBNAAT	Other CBNAAT	Drug resistant TB	LPA for drug resis	HIV	FNAC	CXR	USG ABD	imaging	Hb	MCV	RDW	WBC	Poly	Lympho	Mo0
39	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	12	83	13	15	82	8	8
40	0	TB pericarditis	PICU	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0rmal	CT chest Necrotic Tb	10	78	13	12	78	20	3
41	NAD`	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	terminal ileitis	0t done	11	75	24	12	58	40	6
42	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	milllary TB	0t done	CT Chest bilateral millary patteen of Tb	10.2	61	18	25	74	21	3
43	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	0rmal	0t done	MRI Brain bilateral tiny 0ddules in cerebeller hemispheres	12	78	31	6	73	24	2
44	NAD	Pulmonary TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	abdominal lymphade0pathy	CT HEAD 0RMAL	11.3	80	17	5	90	6	3.3
45	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN TUBERCULAR MENINGITIS	9.4	30	18	7	86	10	3
46	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	7.7	66	20	5	73	15	10
47	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	0t done	CT Chest bilateral millary patteen of Tb	7.6	82	15	3.5	78	20	3
48	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	10.2	74	74	14	68	20	4
49	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN TUBERCULAR MENAINGITIS	12.1	78	16	3.3	78	24	3
50	NAD	Abdominal TB	ward	positive high	positive low	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	CT ABDOMEN- TERMINAL ILEITIS	8.2	76	18	10.2	78	25	3
51	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	11.2	70	15	6.5	78	24	3
52	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	perihilar	0t done	0t done	11	79	14	4	70	30	3
53	nad	Abdominal TB	ward	positive high	positive	0	0 to rifampicin		0.1	nd	0rmal	abdominal lymphade0pathy	0t done	8.6	89	10	19	89	36	3
54	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	0rmal	0t done	MRI Brain bilateral tiny 0ddules in cerebeller hemispheres	12	78	31	6	73	24	2
55	nad	Abdominal TB	ward	negative	negative	fnac	0 to rifampicin	0ne	0.2	nd	0rmal	abdominal lymphade0pathy	0t done	9.8	75	16	10	78	32	3
56	NAD	Pulmonary TB	PICU	positive low	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	10	34	16	16	78	34	3
57	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN Ring ehancing lesion	7.7	66	20	5	73	15	10
58	NAD	Meningitis ? TB	PICU	negative	positive medium	0	0 to rifampicin	0ne			rt hilar lymphade0pathy	0t done	MRI BRAIN:Multiple granulomatous lesion showing 0dular ond ring enhancemenl in bilaleral cerebral and cerebellar hemispheres, pons and right basol ganglia	12	74	30	6	72	3	24
59	NAD	Pulmonary TB	ward	negative	positive	0	0 to rifampicin	0ne	0.1	nd	perihilar	0t done	0t done	7	70	15	6.5	78	24	3
60	NAD	Pulmonary TB	PICU	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	abdominal lymphade0pathy	CT HEAD 0RMAL	11.3	80	17	5	90	6	3.3
61	NAD	CNS TB	PICU	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	11	76	16	9	78	36	3
62	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	pleural effusion	0t done	CT Chest bilateral millary patteen of Tb	7.6	82	15	3.5	78	20	3
63	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	10.2	74	74	14	68	20	4
64	NAD	CNS TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	MRI BRAIN TUBERCULAR MENAINGITIS	12.1	78	16	3.3	78	24	3
65	NAD	Abdominal TB	ward	positive high	positive low	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	CT ABDOMEN- TERMINAL ILEITIS	8.2	76	18	10.2	78	25	3
66	NAD	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	0t done	0t done	11.2	70	15	6.5	78	24	3
67	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.2	nd	perihilar	0t done	0t done	11	79	14	4	70	30	3
68	nad	Abdominal TB	ward	positive high	positive	0	0 to rifampicin		0.1	nd	0rmal	abdominal lymphade0pathy	0t done	8.6	89	10	19	89	36	3
69	NAD	Abdominal TB	PICU	positive high	negative	0	0 to rifampicin	0ne	0.1	nd	0rmal	abdominal lymphade0pathy	0t done	9	75	24	14	70	38	3
70	nad	Abdominal TB	ward	negative	negative	fnac	0 to rifampicin	0ne	0.2	nd	0rmal	abdominal lymphade0pathy	0t done	9.8	75	16	10	78	32	3
71	NAD	Pulmonary TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0rmal	0t done	0t done	12	30	18	7	86	10	3
72	nad	Pulmonary TB	ward	negative	NEGative	0	0 to rifampicin	0ne	0.1	nd	pleural effusion	0t done	not done	9	75	24	12	58	40	6
73	nad	CNS TB	ward	negative	negative	0	0 to rifampicin		0.1	nd	0	0t done	MRI BRAIN TUBERCULAR MENINGITIS	9.4	30	18	7	86	10	3
74	nad	Abdominal TB	ward	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0	0t done	not done	11.2	70	15	6.5	78	24	3
75		Pulmonary TB	PICU	negative	negative	0	0 to rifampicin	0ne	0.1	nd	0	0t done	not done	10	34	16	16	78	34	3

S. No.	Platelets	ESR	Mantoux	Urea	Creatinine	Na	K	SGOT	SGPT	TB	DB	ALP	TP	ALB	Other investigations	Vaccination status	Development/ IQ	Socioeco0mic status	Contact	Already on ATT	Steroids	Anticonvulsants	ATT start	DILI	Final diag0sis	Outcome	Type of TB
39	>2lakh	2	1	22	0.4	135	4	40	48	1.4	0.3	300	7	3.5		seen	0rmal	upper lower	1	0	1	y	22/03/2023	1	CNS tubecucosis	discharge	Extrapulmonary TB
40	>2lakh	2	1	22	0.4	131	4	30	40	0.2	0.2	170	6	3.5		seen	0rmal	lower middle	1	0	0	0	02-10-2023	0	pulmonary TB	discharge	pulmonary TB
41	>2lakh	2	3	8	0.3	140	4.8	31	24	0.5	0.2	413	7	4		0t seen	0rmal	lower middle	es	0	0	0	28/08/2022	0	abdominal TB	discharge	Extrapulmonary TB
42	>7 lakh	2	1	18	0.3	139	4.5	30	11	0.2	0.2	200	8	4		seen	0rmal	lower middle	1	1	0	0	28/03/2023	1	pulmonary TB	DOR	pulmonary TB
43	>3 lakh	1	1	29	0.3	135	5.06	27	13	0.3	0.1	178	8	4.8		0t seen	0rmal	upper lower	0	0	1	1	05-09-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
44	>4 lakh	1	1	23	0.41	136	4.94	14	20	2.42	1.53	205	4	1.8		0t seen	0rmal	upper lower	1	0	0	0	19/04/2022	1	disseminated TB	discharge	Disseminated TB
45	>3 lakh	2	1	39	0.5	133	4.5	22	17	0.6	0.2	121	8	4		0t seen	0rmal	lower middle	1	0	1	1	29/04/2022	0	CNS tubecucosis	discharge	Extrapulmonary TB
46	>1 lakh	2	1	16	0.13	133	3.75	48	25	0.6	0.1	130	8	4		0t seen	0rmal	lower middle	0	0	1	0	16/04/2024	0	CNS tubecucosis	discharge	Extrapulmonary TB
47	> 3 lakh	1	3	10	0.3	140	3.9	42	16	0.3	0.1	200	7.3	3.4		0t seen	0rmal	upper middle	1	0	0	0	09-02-2023	0	pulmonary TB	discharge	pulmonary TB
48	>2 lakh	2	3	21	0.4	138	4.4	42	26	0.5	0.1	188	8	3.6		0t seen	0rmal	lower middle	1	0	0	0	09-02-2022	0	abdominal TB	discharge	Extrapulmonary TB
49	> 2lakh	1	1	20	0.3	140	4.3	40	17	0.3	0.2	200	8	3.3		0t seen	0rmal	lower middle	1	1	1	1	09-02-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
50	>1 lakh	2	4	23	0.2	133	5	6	90	0.3	0	184	3	2		0t seen	0rmal	Upper middle	1	0	0	0	01-08-2024	0	abdominal TB	discharge	Extrapulmonary TB
51	>4 lakh	2	4	8	0.97	135	4	24	652	1.6	1.4	200	7	3		0t seen	0rmal	lower middle	1	1	0	0	17/6/2023	1	abdominal TB	discharge	Extrapulmonary TB
52	>1 lakh	2	4	20	0.4	139	4.7	53	40	0.3	0.2	200	6	4		0t seen	0rmal	lower middle	1	0	0	0	03-07-2024	0	pulmonary TB	discharge	pulmonary TB
53	> 2 lakh	2	1	10	0.3	129	4	20	12	0.2	0.1	536	4	1.4		0t seen	0rmal	lower middle	1	0	0	0	04-05-2023	0	abdominal TB	discharge	Extrapulmonary TB
54	>3 lakh	1	1	29	0.3	135	5.06	27	13	0.3	0.1	178	8	4.8		0t seen	0rmal	upper lower	0	0	1	1	05-09-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
55	>3 lakh	1	4	21	0.3	135	4.4	23	18	0.4	0	125	7	4	FNAc	seen	0rmal	lower middle	1	0	0	0	15/12/2023	0	abdominal TB	discharge	Extrapulmonary TB
56	>2 lakh	2	1	16	0.3	134	4	30	20	0.3	0.2	200	6	4		seen	0rmal	upper lower	1	0	0	0	22/7/2022	0	pulmonary TB	discharge	pulmonary TB
57	>1 lakh	1	1	16	0.13	133	3.75	48	25	0.6	0.1	130	8	4		0t seen	0rmal	lower middle	0	0	1	0	16/04/2024	0	CNS tubecucosis	discharge	Extrapulmonary TB
58	>3lakh	1	1	32	0.3	136	4	22	13	0.6	0.2	173	8	5		0t seen	0rmal	lower middle	0	0	1	0	03-05-2024	0	Tuberculoma	DOR	Extrapulmonary TB
59	>1 lakh	1	4	8	0.97	135	4	24	652	1.6	1.4	200	7	3		0t seen	0rmal	lower middle	1	1	0	0	17/6/2023	1	abdominal TB	discharge	Extrapulmonary TB
60	>4 lakh	1	1	23	0.41	136	4.94	14	20	2.42	1.53	205	4	1.8		0t seen	0rmal	upper lower	1	0	0	0	19/04/2022	1	disseminated TB	discharge	Disseminated TB
61	>4lakh	1	1	136	0.3	126	4	34	18	0.3	0	200	7	3.8		seen	0rmal	upper lower	1	0	0	0	22/03/2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
62	> 3 lakh	2	4	10	0.3	140	3.9	42	16	0.3	0.1	200	7.3	3.4		0t seen	0rmal	upper middle	1	0	0	0	09-02-2023	0	pulmonary TB	discharge	pulmonary TB
63	>2 lakh	2	4	21	0.4	138	4.4	42	26	0.5	0.1	188	8	3.6		0t seen	0rmal	lower middle	1	0	0	0	09-02-2022	0	abdominal TB	discharge	Extrapulmonary TB
64	> 2lakh	1	1	20	0.3	140	4.3	40	17	0.3	0.2	200	8	3.3		0t seen	0rmal	lower middle	1	1	1	1	09-02-2023	0	CNS tubecucosis	discharge	Extrapulmonary TB
65	>1 lakh	2	4	23	0.2	133	5	6	90	0.3	0	184	3	2		0t seen	0rmal	Upper middle	1	0	0	0	01-08-2024	0	abdominal TB	discharge	Extrapulmonary TB
66	>4 lakh	1	4	8	0.97	135	4	24	652	1.6	1.4	200	7	3		0t seen	0rmal	lower middle	1	1	0	0	17/6/2023	1	abdominal TB	discharge	Extrapulmonary TB
67	>1 lakh	2	4	20	0.4	139	4.7	53	40	0.3	0.2	200	6	4		0t seen	0rmal	lower middle	1	0	0	0	03-07-2024	0	pulmonary TB	discharge	pulmonary TB
68	> 2 lakh	2	1	10	0.3	129	4	20	12	0.2	0.1	536	4	1.4		0t seen	0rmal	lower middle	1	0	0	0	04-05-2023	0	abdominal TB	discharge	Extrapulmonary TB
69	>1 lakh	1	1	50	2.8	130	6	80	10	0.3	0.2	300	7	4		0t seen	0rmal	lowe middle	1	1	0	0	14/7/2023	1	abdominal TB	discharge	Extrapulmonary TB
70	>3 lakh	1	4	21	0.3	135	4.4	23	18	0.4	0	125	7	4	FNAc	seen	0rmal	lower middle	1	0	0	0	15/12/2023	0	abdominal TB	discharge	Extrapulmonary TB
71	>3 lakh	2	1	39	0.5	133	4.5	22	17	0.6	0.2	121	8	4	pleuaral fluid	0t seen	0rmal	lower middle	1	0	1	1	08-08-2023	0	pulmonary TB	discharge	Pulmonary TB
72	>2lakh	2	15	8	0.3	140	4.8	31	24	0.5	0.2	413	7	4		not seen	normal	lower middle	1	0	0	0	18/03/2022	0	pulmonary TB	DOR	pulmonary TB
73	>3lakh	2	5	39	0.5	133	4.5	22	17	0.6	0.2	121	8	4		not seen	normal	lower middle	1	0	1	1	29/04/2022	0	CNS tubecucosis	discharged	Extrapulmonary TB
74	>4 lakh	5	30	8	0.97	135	4	24	652	1.6	1.4	200	7	3		not seen	normal	lower middle	1	1	0	0	17/6/2023	1	abdominal TB	discharged	Extrapulmonary TB
75	>2lakh	8	5	16	0.3	134	4	30	20	0.3	0.2	200	6	4		seen	normal	upper lower	1	0	0	0	22/7/2022	0	pulmonary TB	discharged	pulmonary TB

Sadiq Road
Faridkot-151 203 (Pb). INDIA.
Phone : 01639-256232,256236
Tele/Fax : 01639-256235
Email – Thesisbfuhs@gmail.com

No. BFUHS/2K23p-TH/ 28

Date 1/1/2024

The Principal
Dayanand Medical College & Hospital
Ludhiana

Subject:: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 25.09.2023 has approved the plan of thesis of **Lovepreet Singh**, a student of your college for **MD Paediatrics** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Clinical profile of children with tuberculosis in a tertiary care hospital .

Supervisor
Dr. Deepak Bhat
Professor
Dept. of Paediatrics

Co-Supervisor:-
Dr. Gurdeep Singh Dhooria
Professor
Dept. of Paediatrics

The student may submit the thesis in triplicate alongwith the plan in triplicate also, to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She may be directed to attach a photocopy of this letter with the forwarding letter while submitting thesis in the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic, if any.

Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*

CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN

PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MD

In

PAEDIATRICS

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

AUGUST, 2022

DR. LOVEPREET SINGH

DEPARTMENT OF PAEDIATRICS
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL
For the degree of	MD Pediatrics
Name of the candidate	Dr. Lovepreet Singh
Supervisor	Dr. Deepak Bhat, Professor, Department of Pediatrics, DMCH, Ludhiana
Co-Supervisor	Dr. Gurdeep Singh Dhooria, Professor, Department of Pediatrics, DMCH, Ludhiana
Institution	Dayanand Medical College and Hospital,Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction:

Childhood tuberculosis (TB) is a good indicator of recent transmission of TB in the community. The global burden of TB cases shows that 44 % of the total cases were from Southeast Asia, and India alone accounts for 27 % of total burden. The main risk factors of childhood TB are co infection with HIV, overcrowding and immigration. Diagnosing TB in children can be challenging as many childhood diseases mimic TB. So only a high index of suspicion is required for an early diagnosis childhood TB to prevent a possible poor outcome. We thus plan to undertake this study with an objective to evaluate the profile of children with tuberculosis and to determine the risk factors.

Aim of study:

To study the clinical profile of children with Tuberculosis.

Materials & Methods:

This will be a prospective observational study which will be conducted in the department of Pediatrics, Dayanand Medical College and Hospital, Ludhiana. All the diagnosed children with Tuberculosis coming to OPD/IPD will be taken in the study after taking due consent.

Clinical Significance:

After this study, we will be able to better understand the childhood tuberculosis which is one of the common communicable diseases in our country. And as a result try to educate the masses about the transmission and risk factors for this disease.

Keywords: Tuberculosis, CBNAAT, Pulmonary TB, Extrapulmonary TB, Tuberculin skin test (TST)

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL"** exist in the Department of Pediatrics at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate himself under our supervision and guidance.

Supervisor

Dr. Deepak Bhat
Professor
Department of Pediatrics
DMCH, Ludhiana

Co-Supervisor

Dr. Gurdeep Singh Dhooria
Professor
Department of Pediatrics
DMCH, Ludhiana

Head of the Department

Dr. Puneet Aulakh Pooni
Professor & Head
Department of Pediatrics
DMCH, Ludhiana

Place: Ludhiana

Date: 28/9/22

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Lovepreet Singh
Department	Pediatrics
Topic of Thesis	CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL
Likely date of appearing in PG examination	May/ June, 2024
Date of enrollment	5th March, 2022
Name of Head of Department	Dr Puneet Aulakh Pooni
1) Supervisor **2) Co-Supervisor**	Dr Deepak Bhat Dr Gurdeep Singh Dhooria
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)	Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / ~~No~~

Dr. Sandeep Puri
Chairperson
Research Committee

Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. LOVEPREET SINGH VILLAGE GODAIPUR PO RANDHAWA MASANDAN DISTT JALANDHAR.
2	NAME OF THE INSTITUTE	Dayanand Medical College and Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	MD Paediatrics
4	DATE OF ADMISSION OF COURSE	05th March 2022
5	TITLE OF THE TOPIC	CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

The world health organization estimated that since 2015 tuberculosis (TB) has surpassed HIV /AIDS as a leading cause of death from an infectious disease worldwide and almost one third population was infected by mycobacterium tuberculosis. About 95% of TB cases occur in the developing country.

As per Global TB report of 2018, in India approximately 2.2 lakh0 children become ill with TB each year (22 % of global TB burden). Children aged < 15 years constitute 11 % of the total TB cases, with an equal sex ratio.[1]

TB in children has been neglected in the global efforts to control TB. The main reason being less contagious nature of childhood TB and difficulty in its diagnosis due to low acid-fast bacilli positivity rate in children. The data available is usually an underestimation of the actual burden of TB in children Like all other high burden countries, India also faces a huge challenge in detecting and treating childhood TB under the National TB Control Programme.[2]

TB in children is an indicator of the recent transmission of TB in the community.

The government of India also released the National TB Prevalence Survey Report which was conducted from 2019 to 2021 to know the actual disease burden of TB. The report said that there has been an increase in the mortality rate due to all forms of TB between 2019 and 2020 by 11%.[3]

India accounts for one-fourth of the global TB burden. Globally, about 1 million cases of pediatrics TB are estimated to occur every year with more than one lakh estimated deaths every year.[1]

Rise in the urban population with consequent overcrowding and migration of families from rural areas to cities for work have led to increased poverty, malnutrition, morbidity and mortality rate of several diseases including TB.[4]

As above data suggests that Tuberculosis is burden all over world and highest burden is on India. Also, there is a paucity of data from different parts of the country regarding its epidemiological and clinical profile.

With this study we aim to determine clinical features of tuberculosis in children and to identify the underlying risk factors.

WHO announced the “End TB” strategy with the target of reducing tuberculosis (TB) deaths by 90% and 95%, and, incidence by 80% and 90%, by 2030 and 2035, respectively. However, Government of India has decided to aim TB elimination from our country by 2025, ahead of the global target. (Reference WHO End TB strategy 2015).[5]

Childhood TB is an important area of intervention while drawing the road-map to end TB. National Tuberculosis Elimination Program (NTEP) and Indian of Academy of Pediatrics (IAP) have partnered to develop updated guidelines and training program for management of childhood TB in the country. (Reference Ministry of health and family welfare NTEP guidelines 2015).[6]

6.2 REVIEW OF LITERATURE

Tuberculosis is an infectious disease that has plagued humans since the Neolithic times with the earliest reported case dating back to 5000 B.C.[7]

In the year 2016, there were an estimated 10.4 million new cases of TB which included 5.9 million men and 3.5 million women and 1.0 million children with an estimated 14 lakh TB deaths.[8]

In a study conducted at Tuberculosis Research Centre, Chennai over a 15year period the annual risk of TB infection was seen to be 2%.[9]

With an annual risk of infection of 2–3%, close to 40% of the population may be infected with TB the age of fifteen.[10]

Children are poor producers of sputum and in children less than 7 years of age, it is difficult to obtain sputum smear sample for AFB.

Several studies showed cough, fever, loss of appetite, diarrhea, vomiting, and weight loss are the most common symptoms in the children with TB, even in the culture positive cases. The co infection of TB and HIV is difficult to treat with high morbidity and mortality rate.

In 2013, WHO recommended the use of GENE XPERT MTB/RIF to diagnose pediatric TB and Rifampicin Resistance along with clinical profile for ease of diagnosis.[11] In 2014, WHO reported that 70-80% of children with TB have pulmonary tuberculosis.[12] Some national studies have reported increasing incidence of EPTB in children.[13-15]

As children are usually infected by an adult with pulmonary tuberculosis (TB), childhood TB is a reflection of the transmission of Mycobacterium tuberculosis within a community.[16-19]

Poverty has been a significant risk factor for TB in addition to severe malnutrition, illiteracy and a low socio-economic status.[20,21]

Globally, TB incidence is decreasing by about 2% annually but this is not rapid enough to reach the 2020 milestones of the End TB strategy.[22]

Bacillus Calmette Guerin (BCG) vaccination has always been known to protect children from the severe forms of TB especially neuro-TB and disseminated TB . Its efficacy varies from 75–86% for prevention of miliary TB and TB meningitis and is around 50% for pulmonary TB.[23,24]

The estimated national coverage for BCG vaccination in India has increased from 74% to 91% between 1999 and 2013.[20] Poor immunization coverage with BCG vaccine has been shown to play a significant role in the higher incidence and case fatality rate of neuro-TB.[25,26]

The current threat to tuberculosis (TB) control is due to the emergence of strains resistant to the two most potent anti-TB drugs viz., isoniazid (H) and rifampicin (R) (multidrug resistant tuberculosis, MDR-TB).

The response of patients with MDR-TB to treatment is poor and the mortality rate is usually high [26], and situation is further threatened by the emergence and spread of HIV.[27]

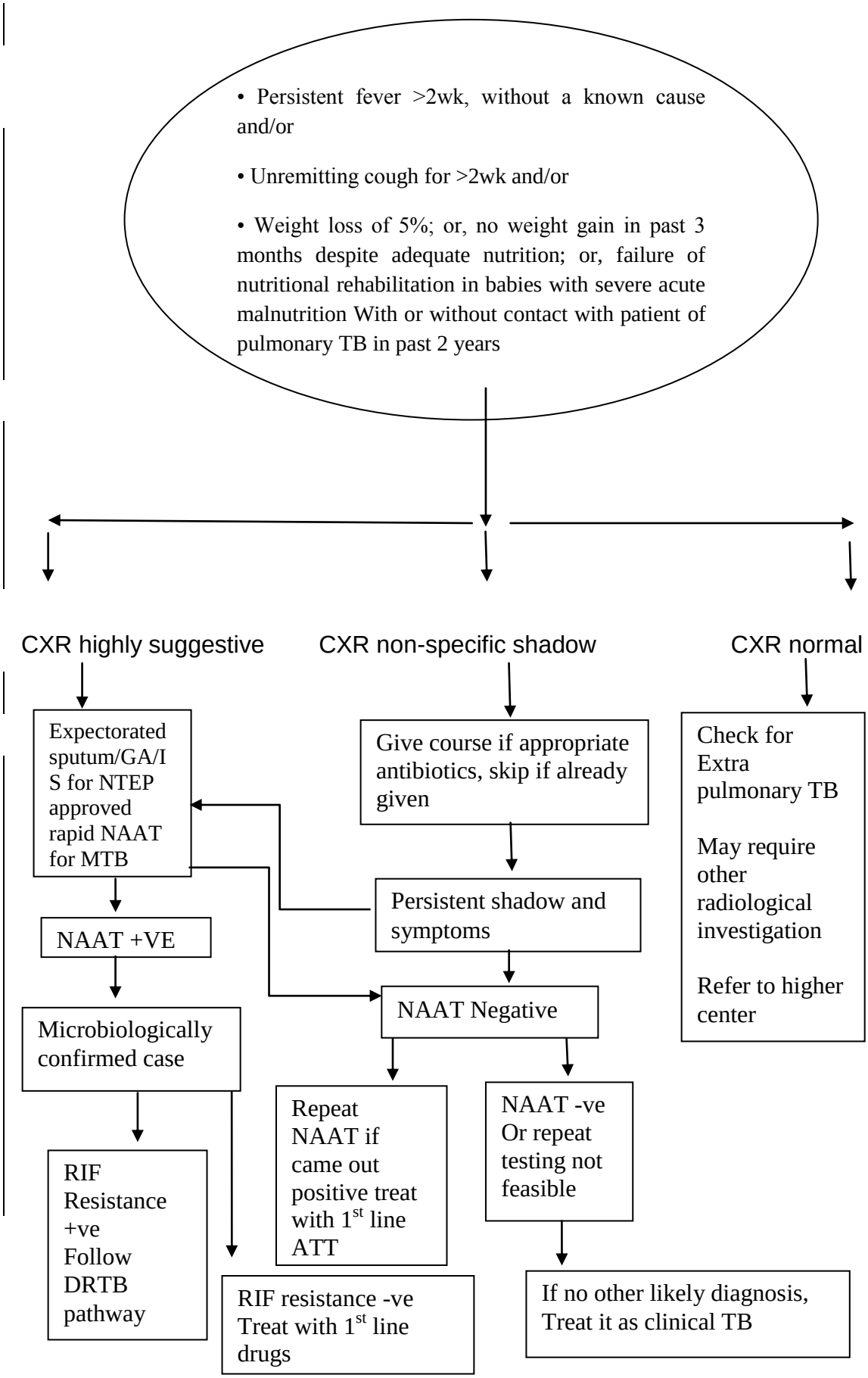
Information on drug resistant (DR) TB is limited to a small number of patients or is incomplete, especially in children. Thus, very less studies was done to define the clinical profile of drug resistant TB in children

Schaaf, et al. reported a prevalence of 6.5% of MDR TB in 2003-2005 in children reported a prevalence of 6.5% of MDR TB in 2003-2005 in children in south Africa.[18]

Recent estimates on the prevalence of MDR-TB in new smear positive pulmonary TB (PTB) cases in adults in India is less than 3% and 12 to 17% amongst smear positive previously treated pulmonary TB cases

It has been previously reported that HIV co-infection increases the risk of getting drug resistance TB.

A study conducted in New York city by Gordin, et al.[28] revealed that HIV and TB co-infected patients were significantly more likely to develop resistance to at least one drug (37% vs. 19%) and MDR (19% vs. 6%) than those without HIV infection. Despite this huge disease burden, children's access to anti tuberculosis treatment in most endemic areas remains poor, as tuberculosis control programs focus predominantly on the treatment of sputum smear– positive adults.


• Persistent fever >2wk, without a known cause and/or
• Unremitting cough for >2wk and/or
• Weight loss of 5%; or, no weight gain in past 3 months despite adequate nutrition; or, failure of nutritional rehabilitation in babies with severe acute malnutrition With or without contact with patient of pulmonary TB in past 2 years
CXR highly suggestive
CXR non-specific shadow
CXR normal
Expectorated sputum/GA/IS for NTEP approved rapid NAAT for MTB
Give course if appropriate antibiotics, skip if already given
Check for Extra pulmonary TB
May require other radiological investigation
Refer to higher center
Persistent shadow and symptoms
NAAT +VE
NAAT Negative
Microbiologically confirmed case
Repeat NAAT if came out positive treat with 1st line ATT
NAAT -ve Or repeat testing not feasible
RIF Resistance +ve Follow DRTB pathway
RIF resistance -ve Treat with 1st line drugs
If no other likely diagnosis, Treat it as clinical TB

Standard of WHO clinical categories and suggested clinical conditions of tuberculosis in children (AIIMS TB guidelines)

H ISONIAZID R RIFAMPICIN Z PYRIZINAMIDE E ETHAMBUTOL

Category 1

New onset sputum positive pulmonary TB

2HRZE 4HR

Category 2

Relapse

Treatment Failure

Return after interrupted treatment

2 SHRZE

1HRZE

7HRE

Category 3

Sputum negative pulmonary TB with limited parenchymal involvement

Extra pulmonary TB (Less severe forms)

2HRZ

4HR

6.3 AIMS AND OBJECTIVES OF THE STUDY

- To study the clinical profile of children presenting with Tuberculosis.

7. MATERIALS AND METHODS

This is a prospective observational study which will be conducted in Department of Paediatrics, Dayanand Medical College and Hospital, Ludhiana. All the patients who have diagnosed Tuberculosis with clinical features, will be taken as subjects after taking consent from each patient for the same.

This study will be conducted after taking approval from the Institutional Ethics committee.

7.1 SOURCE OF DATA

Patients 0-18 years, diagnosed with Tuberculosis in OPDand/OR admitted in Pediatric ward in Department of Pediatrics, Ludhiana in 1 year duration.

7.2 METHOD OF COLLECTION OF DATA

Data would be collected from consenting participants meeting inclusion criteria after briefing them about the purpose of study.

The proforma consists of demographic details of the participants and information related to primary diagnosis and ongoing treatment. A structured proforma based on objectives of study will be designed to assess the clinical features of Tuberculosis

INCLUSION CRITERIA:

1. Patients between 0-18 years of age, diagnosed with tuberculosis.

EXCLUSION CRITERIA:

Non-consenting patients or attendants

SAMPLE STUDY

This study will include all patients under age group of 0-18 year diagnosed with tuberculosis presenting on OPD/IPD at DMCH Ludhiana

OUTCOME: We Will able to study the clinical feature of tuberculosis and comparison between pulmonary and Extra pulmonary Features of tuberculosis.

STATISTICAL ANALYSIS: Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. For comparing categorical data, Chi square ($\chi 2$) test will be performed and

fisher exact test will be used when the expected frequency is less than 5. A probability value (p value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Investigations to be conducted on patients-

- Blood- CBC, LFT, RFT, CRP, Blood culture & sensitivity
- Radiology- Chest X-ray
- CB NAAT sputum
- CBNAAT Gastric aspirate
- Mantoux Test

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Yes. Attached herewith.

8. LIST OF REFERENCES

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PROFORMA

S. No. Name: - Age/Sex: - MRD NO.

Address: - Contact No: -

Socioeconomic Status

(As per modified kuppuswamy scale)

Anthropometry at admission actual expected

interpretation

Weight

Height

BMI

HC

Presenting complaints with duration

Fever yes/no if yes, period

Cough yes/ no if yes, period

Weight loss yes /no if, yes

Period Extra pulmonary symptoms

Neurological s/s: - Seizure/Headache/Altered sensorium/other

Lymph node Enlargement yes/ no Region no. of nodes

Musculoskeletal system involvement: -yes/ no if yes Area

Duration of involvement

Abdominal s/s: - pain yes/no if yes, period

distension yes/no if yes period

upper and lower GI bleed yes/no if yes period

chronic diarrhea yes/no if yes/ period

Signature of Candidate **Signature of Supervisor**

Any other features

Vitals at enrolment HR RRTemperatureSpo2

General Physical Examinations: - Pallor yes/no Cyanosis yes / no

Edema yes/no Lymphadenopathy

yes/ no

Chest examination Normal/ Abnormal, if abnormal findings

Abdominal examination distension yes/no

tenderness yes/no

free fluid yes/no,

bowel sound yes/no

organomegaly yes/no

CVS examination S1 S2 Murmur yes/no cardiomegaly yes/no

CNS examination AVPU GCS

Cranial nerves Motor system

Signs of meningeal irritation

Planters

Tone

Birth history Type of delivery NVD/ LSCS birth weight

cry at birth yes/no

BCG Vaccination yes/no Scar yes/no

Investigations: -

Hb TLC MCV RDW Platelets ESR

X RAY CHEST Findings normal/abnormal if abnormal details

Signature of Candidate **Signature of Supervisor**

	Date	Interpretation
Mantoux test		
CBNAAT sputum/GA		
AFB smear		
CBNAAT (any other body fluid)		
Specimen Culture		
Any other investigations		

USG of any region yes/no findings

Neuroimaging yes/ no findings

CT

MRI

Diagnosis Pulmonary TB/ Extrapulmonary TB

If Extrapulmonary site: -

Treatment

1st line ATT H+R+Z+E

INTENSIVE PHASE Start date End date

Any interruption of treatment – yes/no

If yes Duration reason

Any ALI

Drug induced Acute Liver injury (ALI) Yes/ No

if Yes, drugs use for 2nd line Therapy

Signature of Candidate **Signature of Supervisor**

Restart date of standard 1st Line ATT

Follow Up

At the end of intensive phase continuation Phase

2 months 6 months

12 months for Neuro TB

Clinical features improvement

Weight improvement

Loss to follow up

if yes period

any adverse event reported

Final outcome:-Improved /not improved/ loss to Follow up

Signature of Candidate **Signature of Supervisor**

INFORMED PATIENT CONSENT

Date: _____

I…….D/o, W/o, S/o……..…… am willing to participate in the study **"CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

……. ……
Signature of the Witness Signature of the patient

Name:

Signature of Candidate **Signature of Supervisor**

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____
निवासी _____
इस शोधकार्य "**CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL**" में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____	_____
गवाह के हस्ताक्षर	रोगी के हस्ताक्षर/अंगूठे का निशान
नाम:	नाम:

_____
अन्वेषक के हस्ताक्षर

_____
विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

“CLINICAL PROFILE OF CHILDREN WITH TUBERCULOSIS IN A TERTIARY CARE HOSPITAL” ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

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ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

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ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ